



## **8.0. DESCRIPTION OF THE MEASURES ENVISAGED TO PREVENT, REDUCE AND, WHERE POSSIBLE, ELIMINATE ANY SIGNIFICANT ADVERSE IMPACT ON THE ENVIRONMENT**

Protection measures to prevent the possible negative impact of the planned projects on the environment represent one of the most important parts of the Study, since they enable the competent inspection authority to control the implementation of the project and possible intervention in case of non-compliance with the defined legal obligations and environmental protection measures by the Project Holder.

By analysing the possible adverse effects of the planned Eco Energy complex construction project on the environment, certain measures and procedures can be identified that have been taken and that will provide the necessary conditions, which enable the impact of the project in question to be reduced to the limits of acceptability. For the project in question, the characteristics of the natural environment and the existing state of the environment were considered, along with the technical and technological characteristics of the planned activities, thus reducing environmental degradation and preventing possible adverse impacts on the environment.

The necessary measures to reduce or prevent adverse impacts can be systematized into the following categories:

1. Measures provided for by law and other regulations, norms and standards and deadlines for their achievement;
2. Measures to be taken in the event of an accident;
3. Environmental protection plans and technical solutions (recycling, treatment and disposition of waste materials, reclamation, remediation, etc.);
4. Other measures that may affect the prevention or reduction of harmful effects on the environment:
  - Protection measures during the construction of the project
  - Protection measures during the regular operation of the project
  - Protection measures in case of termination of use or removal of the project.

### **8.1 Measures provided for by law and other regulations, norms and standards and deadlines for their implementation**

To reduce possible negative impacts during the construction and operation of the plant in question, and to ensure environmental protection within acceptable limits, all the usual protection measures provided by law will be applied. The measures envisaged by laws and other regulations include the application of norms and standards in the design, selection, and procurement of equipment for the proposed technological process. Additionally, technical measures will be implemented for the planned activities of waste-to-energy process, mechanical pretreatment of waste to be thermally treated, physical and chemical treatment of residues from the boiler plant, disposal of S/S waste at the Landfill for non-hazardous waste, as well as all accompanying activities.

In accordance with the requirements of the Law on Planning and Construction ("Official Gazette of the RS", no. 72/2009, 81/2009 - corr., 64/2010 - CC, 24/2011, 121/2012, 42/2013 - CC, 50/2013 - CC, 98/2013 - CC, 132/2014, 145/2014, 83/2018, 31/2019, 37/2019 - other law, 9/2020, 52/2021, 62/2023) and the Rulebook on the content, manner and procedure of preparation and manner of control of technical documentation according to the class and purpose of facilities ("Official Gazette of the RS", 96/2023):



- The Project Holder prepared the Preliminary Design and obtained **the Reports on the performed expert control of the Preliminary Design of the Construction of the Waste-to-Energy Plant and the Preliminary Design of the phase construction of the Landfill for non-hazardous waste**<sup>1</sup>. In accordance with the aforementioned Reports, the Audit Committee of the Ministry of Construction, Transport and Infrastructure assessed that the technical documentation was complete and that it was accepted.
  - The Project Holder is obliged to develop the Construction Permit Design (CPD) and its development is in progress, provide technical control of the project and, after obtaining the consent for the environmental impact assessment study, submit an application to the Ministry of Construction, Transport and Infrastructure for the issuance of a Construction Permit **for the construction of a waste-to-energy plant**. This is all in accordance with the Location Requirements issued by the Ministry of Construction, Transport, and Infrastructure, no. ROP-MSGI-32562-LOC-1/2023 of 22 November 2023, and the conditions of other competent authorities:
  - Copy of the plot plan no. 952-04-155-21149/2023 of 12 October 2023, Republic Geodetic Authority, Real Estate Cadastre Service Negotin;
  - Copy of the cadastral plan of lines no. 956-309-25298/202 of 11 October 2023, Republic Geodetic Authority Real Estate Cadastre Sector, Department for Lines Cadastre Niš;
  - Water conditions of the Ministry of Agriculture, Forestry and Water Management no. 325-05-1/210/2022-07 of 14 November 2022 and notice no. 285878 2023 14843 000 000 000 001 of 7 November 2023;
  - Requirements regarding fire and explosion protection measures no. 217-8864/23 of 11/04/2023 217-8865/23 of 13 October 2023, Ministry of the Interior, Emergency Situations Sector, Emergency Situations Department in Bor;
  - Certified certificate, September 2023, Mol;
  - Conditions of the public utility company "Badnjevo" Negotin no. 2962-06/2023-1 of 20 October 2023;
  - Conditions of the Institute for Nature Protection no. 03 br. 021-3738/2 of 10 November 2023;
  - Conditions of the Civil Aviation Directorate of the Republic of Serbia no. 4/3-09-0222/2022-0002 of 03.11.2022 and no. 4/3-09-0322/2023-0002 of 17 October 2023;
  - Terms of Elektrodistribucija Srbije d.o.o. Belgrade, Branch Office Elektrodistribucija Zaječar, no. 2540400-D-10.08-452295/2-2023 dated 23 October 2023;
  - Terms of Elektromreža Srbije no. 130-00-UTD-003-1393/2023 of 20 October 2023;
  - Terms of Srbijagas no. 06-07-11/3213-1 of 31 October 2023;
  - Terms of Telekom Srbija no. D211-442574/2-2023 of 13 October 2023.
- The Project Holder is obliged to develop the Construction Permit Design (CPD), which is currently in progress, provide technical control of the project, and, after obtaining consent for the environmental impact assessment study, submit an application to the Ministry of Construction, Transport, and Infrastructure for the issuance of a Construction Permit for the construction of the **Landfill for non-hazardous waste**. This must be done in accordance with the Location Requirements issued by the Ministry of Construction, Transport, and Infrastructure, No. ROP-MSGI-27919-LOCA-7/2023 of 18 August 2023, as well as the conditions set by other competent authorities:
  - Copy of the plot plan no. 952-04-155-21149/2023 of 12 October 2023, Republic Geodetic Authority, Real Estate Cadastre Service Negotin;

<sup>1</sup> Report on the Expert Review of the Preliminary Design for the Construction of a Waste-to-Energy Facility, Ministry of Construction, Transport, and Infrastructure, No. 000186359 2024 14810 005 000 000 001 of March 26, 2024, and Report on the Expert Review of the Preliminary Design for the Phase Construction of the Landfill for non-hazardous waste, Ministry of Construction, Transport and Infrastructure, no. 000186359 2024 14810 005 000 000 001 of August 06, 2024



- Water conditions of the Ministry of Agriculture, Forestry and Water Management no. 325-05-13/125/2023-07 of 17 August 2023;
  - Opinion of the Public Water Management Company Srbijavode 7615/1 of 25 July 2023;
  - Opinion of the Environmental Protection Agency no. 325-00-00001/252/2023-02 of 25 July 2023;
  - Opinion of the Republic Hydrometeorological Institute no. 922-1-223/2022 of 1 November 2022 and no. 922-1-130/2023 of 21 July 2023;
  - Conditions of the Institute for Nature Protection no. 03 br. 021-2591/2 of 3 August 2023;
  - Terms of Elektromreža Srbije no. 130-00-UTD-003-1399/2023 of 14 November 2022;
  - Conditions of the public utility company "Badnjevo" Negotin no. 3296-06/2022-1 of 04.11.2022 and no. 953-06/2023-1 of 13 April 2023;
  - Notice No. 217-6494/23 of 27 July 2023, Ministry of the Interior, Emergency Situations Sector, Emergency Situations Department in Bor, Preventive Protection Department;
  - Notification of Srbijagas no. 06-07-11/3321 of 27 October 2022;
  - Terms of Telekom Srbija no. D211-430019/2-2022 of 20 October 2022.
- To determine the suitability of facilities for use, preliminary tests and inspections shall be conducted on installations, devices, plants, stability or safety of the facility, devices and facilities for environmental protection, fire protection devices or other tests, in the manner provided for in the technical documentation, during the previously approved trial operation and shall inform the competent authority thereof without delay. The probationary period may last a maximum of one year. It is the obligation of the Project Holder to monitor the results of the trial operation.
  - Upon completion of all the aforementioned works, the Project Holder shall obtain the **Certificate of occupation** for the subject facilities no later than five years from the date the building permit decision becomes final.

In accordance with the provisions of the Law on Integrated Prevention and Control of Environmental Pollution ("Official Gazette of the RS", No. 135/2004, 25/2015, and 109/2021) and the Regulation on the types of activities and facilities for which an integrated permit is issued ("Official Gazette of the RS", No. 84/2005), it is the obligation of the Project Holder, after the probationary period and obtaining the Operating Permit, and before the commencement of operations, to submit an application for the issuance of an integrated (IPPC) permit for the following activities:

## **"5. Waste management**

*5.1. Installations intended for the disposal or reuse of hazardous waste with a capacity exceeding 10 tons per day<sup>2</sup>*

*5.2. Municipal waste incineration plants with a capacity exceeding 3 t/h<sup>3</sup>*

*5.3. Non-hazardous waste disposal facilities with a capacity of over 50 tons per day<sup>4</sup>*

<sup>2</sup> As defined in the list referred to in Article 1 (4) of Directive 91/689/EEC and as defined in Annex IIA and Annex IIB (operations R1, R5, R6, R8 and R9) to Directive 75/442/EEC and in Council Directive 75/439/EEC of 16 June 1975 on the disposal of waste oils.

<sup>3</sup> As defined in the Council Directive 89/369/EEC of 8 June 1989 on the prevention of air pollution from new municipal waste incineration plants, as well as in Council Directive 89/429/EEC of 21 June 1989 on the reduction of air pollution from existing municipal waste incineration plants.

<sup>4</sup> As defined in Annex IIA to Directive 75/442/EEC, under headings D8 and D9."

In addition to the above, the Integrated Permit for the plant in question will be obtained in accordance with the following regulations:

- Law on Environmental Protection ("Official Gazette of the RS", No. 135/2004, 36/09 and 36/2009 - other law, 72/2009 - other law and 43/2011 – CC decision, 14/2016, 76/2018, 95/2018 and 94/2024);
  - Regulation on criteria for determining the best available techniques, for applying quality



standards, as well as for determining emission limit values in an Integrated Permit ("Official Gazette of the RS", No. 84 of 4 October 2005);

- Rulebook on the content, appearance and manner of filling in the application for the issuance of an integrated permit ("Official Gazette of the RS", no. 30 of 11 April 2006, 32 of 30 March 2016, 44 of 8 June 2018 - other law, 4 of 19 January 2024);
- and other relevant environmental regulations.

### 8.1.1 Measures envisaged within the Waste-to-Energy Plant

- Waste treatment is carried out using the best available techniques and technologies (Article 37 of the Law on Waste Management):
- The Waste-to-energy plant was designed based on the technology of the Austrian company "TBU Stubenvoll" GMBH, which has proven references with plants of a similar type throughout Europe. The applied technology **complies with the highest EU standards and BAT**:
  - Commission implementing decision (EU) 2019/2010 of 12 November 2019 establishing the best available techniques (BAT) conclusions, under Directive 2010/75/EU of the European Parliament and of the Council, for waste incineration (notified under document C (2019) 7987) – **Conclusions on the best available techniques for waste incineration**
  - Commission Implementing Decision (EU) 2018/1147 of 10 August 2018 establishing best available techniques (BAT) conclusions for waste treatment, under Directive 2010/75/EU of the European Parliament and of the Council (notified under document C (2018) 5070) (Text with EEA relevance.) – **Conclusions on best available techniques for waste treatment**
  - European Commission, Reference Document on Best Available Techniques on Emissions from Storage, July 2006 – **Best available techniques on Emissions from Storage**
  - JRC Reference Report on **Monitoring of Emissions to Air and Water from IED Installations**, Industrial Emissions Directive 2010/75/EU (Integrated Pollution Prevention and Control), 2018.

The treatment of waste materials (hazardous and non-hazardous waste) will be carried out in accordance with the following legal acts:

- Law on Waste Management (Official Gazette of the RS, No. 36/2009, 88/2010, 14/2016, 95/2018 - other law and 35/2023);
- Law on Packaging and Packaging Waste (Official Gazette of the RS, No. 36/09, 95/18);
  - Rulebook on waste categories, examination and classification ("Official Gazette of the RS", nos. 56/2010, 93/2019 and 39/2021);
  - Rulebook on the form of the document on the movement of hazardous waste, the form of prior notification, the manner of its delivery and the instructions for their completion ("Official Gazette of the RS", No. 17/2017);
  - Rulebook on the Form of Documents for Waste Movement and Instructions for Completion ("Official Gazette of the RS", No. 114/13);
  - Rulebook on the form of Daily Records and Annual Report on waste with instructions for its completion ("Official Gazette of the RS", No. 7/2020 and 79/2021);
  - Rulebook on the Conditions, Methods, and Procedures for Waste Oil Management ("Official Gazette of the RS", No. 71/2010);
  - Regulation on the Method and Procedure for Managing Sludge from Municipal Wastewater Treatment Plants ("Official Gazette of the RS", No. 103/2023);
  - Regulation on the Manner and Procedure for Managing Construction and Demolition Waste ("Official Gazette of the RS", No. 93/2023, 94/2023 - Corr.).

In accordance with Article 26 of the Law on Waste Management, the waste producer (defined as an entity whose activity generates waste or whose prior treatment, mixing, or other procedures result in



a change in the composition or nature of the waste), in this case, the Elixir Craft Project Holder, Eco Lager Branch, is also required to undertake the following activities:

- Develop a **Waste Management Plan** in accordance with Article 15 of the Law and organize its implementation if the annual production exceeds 100 tons of non-hazardous waste or 200 kilograms of hazardous waste;
- Obtain a report on the testing of waste from authorized and accredited laboratories, renew it in the event of a change in technology, a change in the origin of raw materials, or other activities that might affect the characteristics of the waste, and retain the report for five years. After this period, the obligation is to obtain a new waste testing report;
- Ensure the application of the principles of the Waste Management hierarchy;
- Collect the generated waste separately and sort it according to the need for future treatment;
- Temporarily store waste in a way that does not affect human health and the environment and provide conditions to avoid mixing of different types of waste, as well as mixing of waste with water;
- To reduce the operating risk start-up/shut down operations will be carried out in such a way that first/last waste introduced to the boiler contains minimal amount of organic halogenates.
- Hand over the waste to a person authorized to manage it if waste management cannot be organized in accordance with the Law;
- Keep records of waste generated, handed over or disposed of;
- Designate a person responsible for waste management;
- Enable the competent inspector to control the locations, facilities, plants and documentation.
- The waste producer may either manage waste treatment independently or must transfer it to another legal entity or entrepreneur engaged in waste treatment activities. Alternatively, waste may be handled through an intermediary, waste trader, public utility company, public-private partnership, or exported if there is no facility for treating the specific waste in the Republic of Serbia.

In accordance with Article 29 of the Law on Waste Management, the operator of the waste treatment plant (mechanical, waste thermal treatment and physical and chemical treatment of waste), in this case the Project Holder is obliged to:

- Draw up the **Plant Working Plan** as specified in Article 16 of the Law, and ensure its implementation and updating (every three years, as well as in the event of significant operational changes to the plant);
- Develop an accident protection plan in accordance with the Law;
- Obtain a waste treatment permit and perform waste treatment activities in accordance with that permit;
- Publish a list of waste for the treatment of which it is authorized;
- Operate the waste treatment equipment and plant in accordance with the relevant technical instructions;
- Secures waste and protects it from scattering and leakage;
- In the event of an accident, notify the competent authority without delay in accordance with the Law;
- Keep records of waste in accordance with the Law;
- Designate a qualified person responsible for professional work in the waste treatment plant;
- Charges for waste treatment services in the plant;
- Enable the competent inspector to supervise the locations, facilities, plant and documentation.





In accordance with Article 41 of the Law on Waste Management ("Official Gazette of RS", no. 36/2009, 88/2010, 14/2016, 95/2018 – Other Laws and 35/2023) and Article 7 of the Regulation on technical and technological conditions for the design, construction, equipment and operation of waste thermal treatment plants, emission limit values and their monitoring ("Official Gazette RS", No. 103/2023), the project holder is obliged to obtain from the competent Ministry of Environmental Protection, Department for Waste Management, a permit for the thermal treatment of waste by incineration before obtaining the so-called IPPC permit, which in addition to the prescribed conditions for work, contains the following:

- 1) types of waste that can be treated in accordance with the special regulation on categories, testing and classification of waste, if possible with data on the amount of each type of waste;
- 2) total capacity of the incineration or co-incineration plant;
- 3) emission limit values;
- 4) data on pH values, temperature and flow of wastewater discharge, flow and all other quality parameters of wastewater, required water conditions by competent authorities;
- 5) the method of measurement and the sampling and measurement deadlines that should be followed in order to comply with the conditions for monitoring emission limit values;
- 6) maximum allowed working time in periods of technical interruptions or breakdowns of devices for pollution control and monitoring, i.e. transition periods for the operation of the plant and its parts, as well as measures for interruption of work in accidental situations;
- 7) data on the highest and lowest ignition points of the waste that will be thermally treated, the highest and lowest calorific values of the waste, the maximum content of polychlorinated biphenyls, chlorine, sulfur, heavy metals and other substances emitted by the plant;
- 8) data on the method of measuring emissions into the air;
- 9) average composition of mixed municipal waste intended for incineration.

#### Additionally:

- The project defines that waste cannot be temporarily stored at the location of the waste producer /owner for more than 36 months, after the expiration of which the waste must be handed over for treatment, i.e. reuse or disposal (Article 36 of the Law on Waste Management).
- It is envisaged that non-hazardous and hazardous waste whose storage and treatment is planned at the location in question must be stored and treated in the prescribed manner and treated in accordance with the following provisions **of the Rulebook on the conditions and manner of collection, transport, storage and treatment of waste used as secondary raw material or for obtaining energy ("Official Gazette of the RS", No. 98/2010)**:
  - The storage of waste to be used for a secondary raw material or to obtain energy shall be carried out in such a way as to ensure the protection of the environment and human health.
  - Person collecting waste used for secondary raw material or to obtain energy:
    - 1) take over waste used for secondary raw material or to obtain energy from the waste owner;
    - 2) keep records of the collected and handed over quantities of waste used as secondary raw material or to obtain energy.
  - The waste storage used for secondary raw material is designed as a closed type storage, fenced and under constant supervision.
  - Waste cannot be stored in the area or on surfaces not intended for storage.
  - A waste storage facility used for secondary raw material or to obtain energy is designed as a storage specifically to include:
    - 1) a stable and impermeable substrate with adequate protection against atmospheric influences;
    - 2) an accident prevention system;
    - 3) a system for the complete controlled reception of atmospheric water from all manipulative surfaces;



- 4) fire protection system in accordance with special regulations.

Hazardous waste is classified according to the origin, characteristics and composition that make it hazardous, in accordance with the regulation governing the category, testing and classification of waste. Hazardous waste whose storage is planned at the location in question must be stored in the prescribed manner and treated in accordance with the following provisions **of the Rulebook on the Method of Storage, Packaging and Labelling of Hazardous Waste ("Official Gazette of the RS", No. 92/2010 and 77/2021):**

- Storage of hazardous waste will be carried out in a way that ensures the lowest risk of endangering human life and health and the environment;
- Hazardous waste will be stored in tanks, containers and other vessels within the storage facility;
- Wood waste containing hazardous substances will be stored in a closed storage facility, on a solid stable substrate with spillage collection equipment and degreasing agents;
- The qualified person responsible for professional work is responsible for handling hazardous waste during storage, in accordance with the governing Law Waste Management;
- Hazardous waste will be stored in a way that provides easy and free access to stored hazardous waste for control, repackaging, measurement, sampling, transport, etc.;
- The storage will be fenced according to the design in order to prevent access to unauthorized persons, physically secured, locked and under constant supervision;
- Records shall be kept of all activities related to the storage of hazardous waste, in accordance with the governing Law Waste Management and special regulations;
- The hazardous waste storage container should be closed and made of material that ensures the stability of storage according to the chemical impact of the waste itself, impermeability with adequate protection against atmospheric influences.
- Hazardous waste storage containers, with all their components, should be chemically resistant to the impact of hazardous waste contained in them.
- Liquid storage of waste is carried out in a storage container provided with an impermeable bundwall that can accommodate the entire amount of waste in the event of an accident (leak).
- Hazardous waste storage containers, with all their components, should be chemically resistant to the impact of hazardous waste contained in them.
- Hazardous waste storage containers are regularly maintained, cleaned and not used after the expiration of the established shelf life.
- Storage containers are regularly inspected through regular checks of containers and their components for damage, leakage, corrosion, or other form of damage.
- If the hazardous waste storage container or any of its components is technically defective, corroded, or visibly damaged, the hazardous waste must be transferred to a technically sound container in a safe and prescribed manner.
- During storage, hazardous waste is packaged and labelled in a way that ensures safety for human health and the environment.
- Hazardous waste is classified according to the origin, characteristics and composition that make it hazardous, in accordance with the regulation governing the category, testing and classification of waste.
- If hazardous waste consists of several types of waste, its classification is based on the most common component.
- Hazardous waste management will be carried out in accordance with the conclusions on best available techniques (Commission Implementing Decision (EU) 2018/1147 of 10 August 2018 establishing best available techniques (BAT) conclusions for waste treatment, under Directive 2010/75/EU of the European Parliament and of the Council (notified under document C(2018) 5070) (Text with EEA relevance.) – **Conclusions on best available techniques for waste treatment** and European Commission, Reference Document on



## Best Available Techniques on Emissions from Storage, July 2006 – **The Best Available Techniques on Emissions from Storage**).

In addition to the measures specified by the Regulation on Technical and Technological Conditions for the Design, Construction, Equipment, and Operation of Facilities and Types of Waste for Waste Thermal Treatment, Emission Limit Values, and Their Monitoring ("Official Gazette of the RS", No. 103/2023), air protection will also be implemented in accordance with the following regulations:

- Law on Air Protection ("Official Gazette of the RS", No. 36/2009, 10/2013 and 26/2021 - other Law);
  - Regulation on Conditions for Monitoring and Air Quality Requirements ("Official Gazette of the RS", No. 11/2010, 75/2010, and 63/2013);
  - Regulation on the Measurement of Emissions of Pollutants into the Air from Stationary Sources of Pollution ("Official Gazette of the RS", No. 5/2016 and 10/2024);
  - Regulation on the Limit Values of Emissions of Pollutants into the Air from Stationary Pollution Sources, except for Combustion Plants ("Official Gazette of the RS", No. 111/2015, 83/2021); as well as Commission implementing decision (EU) 2019/2010 of 12 November 2019 establishing the best available techniques (BAT) conclusions, under Directive 2010/75/EU of the European Parliament and of the Council, for waste incineration (notified under document C(2019) 7987) – **Conclusions on best available techniques for waste incineration** and Commission Implementing Decision (EU) 2018/1147 of 10 August 2018 establishing best available techniques (BAT) conclusions for waste treatment, under Directive 2010/75/EU of the European Parliament and of the Council (notified under document C(2018) 5070) (Text with EEA relevance.) – **Conclusions on best available techniques for waste treatment**.
  - To reduce the operating risk start-up/shut down operations will be carried out in such a way that first/last waste introduced to the boiler contains minimal amount of organic halogenates.

In accordance with Article 58 of the Law on Air Protection, the Project Holder is obliged to:

- Submit data on the stationary source of pollution and any change (reconstruction) to the Ministry of Environmental Protection, i.e. the Environmental Protection Agency and the competent authority of the local self-government unit;
- Ensure regular monitoring of emissions in accordance with the monitoring plan, Chapter 9 of this study and the integrated permit, and to keep records thereof;
- Provide continuous emission measurements when prescribed for certain pollutants and/or sources of pollution, either independently or through automatic continuous measurement devices, with the consent of the Ministry;
- Provide emission control measurements through an authorized legal entity, if it performs emission measurements independently;
- Provide the prescribed periodic emission measurements, through an authorized legal entity, twice a year, if it does not perform continuous emission measurements;
- Ensure air quality monitoring at the order of the competent inspection authority, independently or through an authorized legal entity;
- Keep records of the performed measurements with data on measuring points, results and frequency of measurements and submit the data in the form of a prescribed report to the Ministry or the Agency within the prescribed deadline.
- Keep records of the type and quality of raw materials, fuels and waste in the incineration process;
- Keep records of the operation of devices for the prevention or reduction of emissions of pollutants, as well as measuring devices for measuring emissions.

Regulation on Technical and Technological Conditions for the Design, Construction, Equipping, and Operation of Plants and Types of Waste for Waste Thermal Treatment, Emission Limit Values, and





Their Monitoring ("Official Gazette of the RS", No. 103/2023), water protection will also be implemented in accordance with the following legal acts:

- Law on Waters ("Official Gazette of the RS", No. 30/2010, 93/2012, 101/2016, 95/2018 and 95/2018 - other Law);
  - Rulebook on Hazardous Substances in Waters ("Official Gazette of SRS", No. 31/1982);
  - Rulebook on Parameters of Ecological and Chemical Status of Surface Waters and Parameters of Chemical and Quantitative Status of Groundwater ("Official Gazette of the RS", No. 74/2011);
  - Rulebook on the Manner and Conditions for Quantity Measurement and Wastewater Quality Testing and the Content of the Report on Measures Performed ("Official Gazette of the RS", No. 18/2024);
  - Regulation on Water Classification ("Official Gazette of SRS", no. 5/1968);
  - Regulation on the Categorization of Watercourses ("Official Gazette of the SRS", no. 5/1968 - other law);
  - Regulation on Limit Values of Pollutants in Surface and Groundwater and Sediment and Deadlines for Achieving Them ("Official Gazette of the RS", No. 50/2012);
  - Regulation on Limit Values of Priority and Priority Hazardous Substances Polluting Surface Waters and Deadlines for Achieving Them ("Official Gazette of the RS", No. 24/2014
  - Regulation on Limit Values of Emissions of Pollutants into Water and Deadlines for Achieving Them ("Official Gazette of the RS", No. 67/2011, 48/2012 and 1/2016);
  - Regulation on the Ecological Network ("Official Gazette of the RS", no. 102/2010).
  - Water Management Strategy on the Territory of the Republic of Serbia until 2034 ("Official Gazette of the RS", No. 3/2017).
- In accordance with the Law on Waters ("Official Gazette of the RS", No. 30/2010, 93/2012, 101/2016, 95/2018, and 95/2018 - other Law), as well as the by-laws and obtained Water Conditions, it is the obligation of the Project Holder to obtain water consent and a water permit.
- It is the obligation of the Project Holder to partially or completely remove pollutants in water as well as to treat wastewater, in accordance with the aforementioned law and special laws governing the field of environmental protection, i.e. regulations adopted based on those laws.
- Wastewater treatment will be carried out to a level that corresponds to the emission limit values or to a level that does not violate the environmental quality standards of the recipient, in accordance with the regulations of the Republic of Serbia governing the limit values of pollutants in surface and groundwater, the limit values of priority, hazardous and other pollutants and the regulation governing the limit values for the emission of pollutants into water, as well as the values defined by the conclusions on the best available techniques (BATC)<sup>2</sup>, taking a more stringent criterion, which in this case represent the BAT values.
- The project holder is obliged to set up devices for measuring and continuously measure the quantities of wastewater, to examine the parameters of wastewater quality and their impact on the recipient, to keep the reports on the performed measurements for at least five years and to submit them to the public water management company, the ministry responsible for environmental protection and the Environmental Protection Agency once a year.
- The Project Holder is obliged to measure the quantities and test the quality of wastewater before and after treatment, to ensure the regular functioning of devices, facilities, i.e. wastewater treatment plants and to keep a log of their operation.
- If there is an imminent danger of pollution, i.e. pollution of surface and groundwater, the Project Holder is obliged to take measures to prevent, i.e. to reduce and remediate water pollution and to plan the means and deadlines for their realization.

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<sup>2</sup> Commission implementing decision (EU) 2019/2010 of 12 November 2019 establishing the best available techniques (BAT) conclusions, under Directive 2010/75/EU of the European Parliament and of the Council, for waste incineration (notified under document C (2019) 7987) – Conclusions on best available techniques for waste incineration



- Wastewater, surface and groundwater quality testing may be performed by a legal entity authorized by the Ministry to perform these activities.

Land protection will be carried out in accordance with the following legal acts:

- Law on Soil Protection ("Official Gazette of the RS", No. 112/2015);
  - Rulebook on the List of Activities That May Be the Cause of Soil Pollution and Degradation, Procedure, Data Content, Deadlines, and Other Requirements for Soil Monitoring ("Official Gazette of the RS", No. 102/2020);
  - Rulebook on the Methodology for the Development of Rehabilitation and Remediation Projects ("Official Gazette of the RS", No. 74/2015);
  - Rulebook on the Content and Form of Soil Monitoring Reports ("Official Gazette of the RS", No. 126/2021);
  - Regulation on Systematic Monitoring of Soil Condition and Quality ("Official Gazette of the RS", No. 88/2020);
  - Regulation on Limit Values of Pollutants, Harmful Substances, and Hazardous Materials in Soil ("Official Gazette of the RS", No. 30/2018 and 64/2019).
- In accordance with Article 30 of the Law on Land Protection, the owner or user of the land or plant, whose activity may be or is the cause of soil pollution and degradation, in this case Elixir Craft, the Eco Energy branch shall monitor the land in accordance with this Law, in such a way that:
  - presents data on the quality of the soil before the start and after the completion of the activity;
  - monitors changes of the soil and in the soil in the prescribed manner in the zone of impact of its
  - submit data on changes in the soil and in the soil to the Ministry and the Environmental Protection Agency.
- Soil sampling and analysis of soil quality parameters shall be performed by an authorized organization in accordance with the Law on Soil Protection.

Noise protection will be carried out in accordance with the following legal acts:

- Law on Environmental Noise Protection ("Official Gazette of the RS", No. 96/2021);
  - Rulebook on the Content and Methods for Creating a Strategic Noise Map and Action Plan, the Procedure for Presenting Them to the Public, and Their Formats ("Official Gazette of the RS", No. 90/2023);
  - Rulebook on Noise Measurement Methods, the Content and Scope of Environmental Noise Measurement Report ("Official Gazette of the RS", No. 139/2022);
  - Regulation on Noise Indicators, Limit Values, Noise Indicators Assessment Methods, Annoyance and Harmful Effects of Environmental Noise ("Official Gazette of the RS", no. 75/2010).
- In accordance with Article 10 of the Law on Environmental Noise Protection, legal entities that, through their activities, affect or may affect noise levels exceeding the limit values are obliged to ensure the following: participation in the costs of environmental noise protection, including investment, operational, and production costs; monitoring the impact of their activities on noise; and the implementation of appropriate noise control measures and sound protection in accordance with this Law and the applicable environmental protection legislation.
- In accordance with Article 23 of the Law on Environmental Noise Protection, the Project Holder is obligated to measure environmental noise levels periodically, at least once every three years.
- Noise measurements from individual sources shall be conducted in accordance with the regulations specified in Article 18, paragraph 3 of the aforementioned Law.
- Noise monitoring is conducted through systematic observation of noise indicators and the assessment of the impact of noise on the environment.



In accordance with the Rulebook on the Methodology for Developing the National and Local Register of Pollution Sources, as well as the Methodology for Types, Methods, and Deadlines for Data Collection ("Official Gazette of the RS", Nos. 91/2010, 10/2013, 98/2016, 72/2023, 53/2024), data for the National Register of Pollution Sources must be submitted to the Environmental Protection Agency by March 31 of the current year for the previous year's data. Reports for the National Register are to be submitted electronically by entering data into the National Register's information system, in accordance with regulations governing electronic documents, electronic identification, and trusted services in electronic business. Reports on measurements of emitted pollutants into the air and water should be submitted in electronic form (pdf format) to the relevant email address published on the Agency's website.

In addition to the aforementioned legal acts, during the work, comply with the following regulations:

- Law on Nature Protection (Official Gazette of the RS, No. 36/2009, 88/2010, 91/2010 - corr., 14/2016, 95/2018 - other Law and 71/2021);

Accident/fire protection will be carried out in accordance with the following legal acts:

- Law on Fire Protection ("Official Gazette of the RS", No. 111/2009, 20/2015, 87/2018 and 87/2018 - other Laws);
  - Rulebook on the Organization of Fire Protection According to the Category of Fire Risk („Official Gazette of the RS", No. 6/2021);
  - Rulebook on Technical Norms for the Protection of Storages from Fire and Explosions ("Official Gazette of SFRY", No. 24/1987);
  - Rulebook on Technical Norms for Fire Protection of Industrial Facilities ("Official Gazette of the RS", No. 1/2018, 81/2023);
  - Rulebook on Technical Norms for Installations for the Hydrant Fire Extinguishing Network ("Official Gazette of the RS", No. 3/2018);
  - Rulebook on Technical Norms for the Protection of Facilities from Atmospheric Discharge ("Official Gazette of SRY" No. 11/1996)
  - Rulebook on the Minimum Content of the General Part of the Training Program for Workers in the Field of Fire Protection ("Official Gazette of the SRS", No. 40/1990).
  - Rulebook on Technical Norms for the Protection of Electric Power Plants and Devices from Fire ("Official Gazette of SFRY", No. 74/90)
  - Rulebook on Technical Norms for Fire Protection of Residential and Commercial Buildings and Public Facilities ("Official Gazette of the RS", No. 22/2019)
  - Rulebook on Technical Norms for Access Roads, Turnpikes, and Arranged Plateaus for Firefighting Vehicles in the Vicinity of a Facility with an Increased Risk of Fire ("Official Gazette of FRY" No. 8/95);
  - Rulebook on Technical Requirements for Fire Safety of External Walls of Buildings ("Official Gazette of the RS", No. 103/2018)
  - Regulation on the Classification of Buildings, Activities, and Land into Fire Hazard Categories ("Official Gazette of the RS", No. 76/2010);
- It is the obligation of the Project Holder to prepare the Main Fire Protection Design as part of the design and technical documentation along with the Construction Design and to obtain the approvals from the Ministry of the Interior.
- The Project Holder is obligated to contact the relevant Ministry of the Interior to assess the categorization of facilities, activities, and land based on fire risk. This assessment should consider the technological processes occurring within the facilities; the type and quantity of materials produced, processed, or stored; the materials used in the construction of the facility; the facility's importance and size; and the type of plant cover. This is necessary to establish the appropriate organization and implement the measures needed for effective fire protection.



- Entities in the first and second fire risk categories are required to develop a Fire Protection Plan, obtain approval from the relevant authority, and follow the procedures outlined in the Fire Protection Plan. The Fire Protection Plan should, among other things, provide detailed information on the number of firefighters, the technical equipment and training of the fire brigade, the organization of fire protection preventive measures, continuous duty, and the number of trained personnel for fire protection implementation. Facilities classified in the third fire risk category must establish Fire Protection Rules.
- For individual units of the facility for which fire protection is determined by special regulations, standards and other acts governing the field of fire and explosion protection, fire protection measures provided for by these regulations have been applied as follows:
  - For equipment and installations related to ventilation and air conditioning, the necessary fire protection measures required to meet the basic fire protection standards are prescribed in the Rulebook on Technical Norms for Ventilation and Air Conditioning Systems ("Official Gazette of SFRY", No. 38/89 and "Official Gazette of the RS", No. 118/2014).
  - The standard SRPS EN 12845 was applied for the design of the automatic fire extinguishing system (sprinkler installation);
  - For the design of a stable system for automatic fire detection and alarm, the Rulebook on Technical Standards for Stable Fire Alarm Installations and the standard SRPS EN 54 were applied.
- The Project Holder is obligated to obtain a decision from the competent Ministry of the Interior of the Republic of Serbia, determining the facility's suitability for use in terms of implementing the fire protection measures specified in the technical documentation, in accordance with Article 36, Paragraph 2, Item 4 of the Law on Fire Protection.
- Law on Explosive Substances, Flammable Liquids and Gases ("Official Gazette of SRS", No. 44/1977, 45/1985 and 18/1989 and "Official Gazette of the RS", No. 53/1993 – other Law, 67/1993 - other Law, 48/1994 - other Law, 101/2005 - other Law, 54/2015 - other Law) and according to the above, Ex zones were determined where the Ex-equipment will be installed;
- Law on Flammable and Combustible Liquids and Flammable Gases ("Official Gazette of the RS", No. 54/2015).
  - Rulebook on Technical Standards for Fire and Explosion Safety of Facilities and Structures for Flammable and Combustible Liquids and for the Storage and Transfer of Flammable and Combustible Liquids („Official Gazette of the RS”, nos. 114/2017 and 85/2021);
- Law on Disaster Risk Reduction and Emergency Management ("Official Gazette of the RS", No. 87/2018)
  - Rulebook on the Content of Information on Hazards, Measures, and Procedures in Case of Accidents („Official Gazette of the RS", No.18/2012);
  - Regulation on Compulsory Means and Equipment for Personal, Mutual and Collective Protection Against Natural and Other Disasters ("Official Gazette of the RS", No. 3/2011 and 37/2015).
  - Regulation on the Content, Manner of Preparation and Obligations of Entities Related to the Preparation of Disaster Risk Assessment and Protection and Rescue Plans ("Official Gazette of the RS", No. 102/2020).
  - Rulebook on the Organization and Method of Operation of the Fire and Rescue Unit ("Official Gazette of the RS", No. 66/2021);
  - Rulebook on the Manner of Preparation and Content of the Accident Protection Plan ("Official Gazette of the RS", No. 41/2019);
  - Rulebook on the Type and Quantity of Hazardous Substances on the Basis of which the Accident Protection Plan is Drawn Up ("Official Gazette of the RS", No. 34/2019);
  - Regulation on the Implementation of Evacuation ('Official Gazette of the RS', No. 22/2011);



Pursuant to the provisions of the Seveso Directive, Article 58 of the Law on Environmental Protection (Official Gazette of the RS, No. 135/2004, 36/2009, 36/2009 - Other Law, 72/2009 - Other Law, 43/2011 - Decision of the Constitutional Court, 14/2016, 76/2018, 95/2018, and 94/2024 – other laws) and the Rulebook on the List of Hazardous Substances and Their Quantities and Criteria for Determining the Type of Documents Produced by the Operator of Seveso Installations or Establishments ("Official Gazette of the RS", No. 41/2010, 51/2015, and 50/2018), and considering the maximum possible quantities of hazardous substances that may be present at any time in the complex, the facility in question is classified as a "higher-tier" Seveso plant. Therefore, it is the obligation of the Project Holder, in terms of managing accident risk, to:

- In accordance with the Rulebook on the Content of the Notification on the New Seveso Plant or Complex, Existing Seveso Plant or Complex and on the Permanent Cessation of Operation of the Seveso Plant or Complex ("Official Gazette of the RS", No. 41/2010), submit the Notification on the New Seveso Plant or Complex at least three months before the start of operation;
- In accordance with the Rulebook on the Content of the Accident Prevention Policy and the Content and Methodology for Preparing the Safety Report and the Accident Protection Plan ("Official Gazette of the RS", No. 41/2010), prepare the Safety Report and the Accident Prevention Plan and submit them to the competent authority at least three months prior to the commencement of operation;
- to submit a request for approval of the Safety Report and Accident Protection Plan, along with the required documents.

Management of raw materials/chemicals will be carried out in accordance with the following legal acts:

- Law on Chemicals (Official Gazette of the RS, No. 36/2009, 88/2010, 92/2011, 93/2012, 25/2015);
  - Regulations on the List of Classified Substances (Official Gazette of the RS, No. 41/2023);
  - Rulebook on the Classification, Packaging, Labelling and Advertising of Chemicals and Products in accordance with the UN Globally Harmonized System of Classification and Labelling ("Official Gazette of the RS" No. 105/2013, 52/2017, 21/2019, 40/2023);
  - Rulebook on the Content of the Safety Data Sheet ("Official Gazette of the RS", No. 11/2024)
  - Rulebook on the Register of Chemicals ("Official Gazette of the RS", No. 16/2016, 6/2017, 117/2017, 44/2018 - other Law, 7/2019, 93/2019, 6/2021, 126/2021, 20/2023 and 10/2024).
- The packaging of dangerous chemicals must correspond to the properties, purpose and method of use of the chemical or product and must be labelled in the prescribed manner.
- It is the responsibility of the Project Holder to keep records on chemicals, which in particular contain data on the identity of the chemical, distributors and quantities of chemicals
- All chemicals used must have a safety data sheet, which in particular contains the identification of the chemical, data on the properties of the chemical, the method of use, preventive measures, risk reduction measures and data on the supplier of the chemical.
- The Project Holder is obliged to store dangerous chemicals in such a way that they do not endanger the life and health of people and the environment.
- The Project Holder is obliged to collect, store and safely dispose of the residues of dangerous chemicals and empty packaging in accordance with the regulations governing waste management.

### **8.1.2 Measures provided for within the framework of the Landfill for non-hazardous waste**

The Landfill for non-hazardous waste is designed to complete the process and manage the residues from the fluidized bed boiler plant (unburned solid residues such as slag, ash, sludge/thickened sediment from wastewater treatment), which have been previously





stabilized and solidified through physical-chemical treatment, as close as possible to their point of origin, all in accordance with the Law on Waste Management ("Official Gazette of the RS", No. 36/2009, 88/2010, 14/2016, 95/2018 - other Law, and 35/2023), Regulation on disposal of waste on landfills ("Official Gazette of the RS", No. 92/2010) and the principles of Waste Management.

- In accordance with Article 30 of the Law on Waste Management, the operator at the landfill (Project Holder) is obliged to, and accordingly, the Project Holder will:
  - Develop the **Plant Working Plan** as specified in Article 16 of this Law and ensure its implementation and updating;
  - Develop an Accident Protection Plan in accordance with the law;
  - Obtain a waste disposal permit and dispose of waste in accordance with that permit;
  - Implement measures to ensure environmental protection, in accordance with regulations;
  - Establish monitoring of the operation of the landfill during the active and passive phase of work;
  - Ensure the reclamation of the landfill after its closure and perform expert supervision of the landfill or location for a period of at least 30 years, with the aim of reducing risks to human health and the environment;
  - In the event of an accident, notify the competent authority without delay in accordance with the Law;
  - Keep records of waste in accordance with the Law;
  - Designate a qualified person responsible for professional work at the landfill;
  - Enable the competent inspector to control the locations, facilities, plants and documentation.
  - The operator at the landfill is obliged, in accordance with the aforementioned law, to refuse to accept waste that does not meet the requirements for waste disposal from the permit or to refuse to accept waste when mixed with some other waste, i.e. it poses a risk to human health or the environment. The operator is obliged to inform the licensing authority about the refusal to accept waste.
- In accordance with Article 42 Law on Waste Management:
  - Disposal of waste at the landfill shall be carried out if there is no other appropriate solution, in accordance with the principle of the Waste Management hierarchy.
  - Waste shall be treated before disposal in accordance with the provisions of this Law and other regulations.
  - The waste is disposed of at a landfill that meets the technical, technological and other conditions and requirements, in accordance with the permit issued based on the aforementioned Law.
  - The acceptance of waste at the landfill will be carried out according to the procedures set forth in the relevant regulation:
    - Regulation on the Disposal of Waste at Landfills ("Official Gazette of the RS", No. 92/2010)
    - Rulebook on Waste Categories, Examination and Classification ("Official Gazette of the RS", No. 56/2010, 93/2019 and 39/2021): Disposal of non-reactive hazardous waste at Landfill for non-hazardous wastes.
    - EU Landfill Directive: (Directive (EU) 2018/850 of the European Parliament and of the Council of 30 May 2018 amending Directive 1999/31/EC on the landfill of waste);
  - Prior to disposal, the landfill operator shall ensure the verification of the delivered waste, including its characterization, identification by type, quantity, and properties, by determining the waste mass and reviewing the accompanying documentation before acceptance.

Article 59a of the Law on Waste Management ("Official Gazette of the RS", No. 36/2009, 88/2010, 14/2016, 95/2018 - other Law, and 35/2023) and the Regulation on the Type of Financial Guarantees and Equivalent Insurance ("Official Gazette of the RS", No. 103/23) stipulate that the Operator, and



thus Elixir Craft, Eco Energy Branch, is obligated to provide a financial guarantee and equivalent insurance to ensure the proper conduct of waste management activities.

- The landfill operation procedure will be carried out in accordance with the technical and technological conditions provided for in the design and technical documentation, permit, law and the Regulation on the Disposal of Waste at Landfills ("Official Gazette of the RS", No. 92/2010).
- It is the obligation of the Project Holder to monitor the operation of the landfill in accordance with the proper technological procedure and legal obligations (Article 26):
  - 1) monitoring of meteorological parameters;
  - 2) surface water monitoring;
  - 3) monitoring of leachate;
  - 4) groundwater monitoring;
  - 5) monitoring the amount of rainwater;
  - 6) landfill stability monitoring;
  - 7) monitoring of protective layers;
  - 8) monitoring of pedological and geological characteristics.
- It is envisaged by the project that the monitoring will be carried out by sampling and measurement in the manner given in Appendix 6. – Monitoring the operation of the landfill, which is printed with the Regulation on the Disposal of Waste at Landfills ("Official Gazette of the RS", No. 92/2010) and forms an integral part thereof.
- Sampling and measurement will be carried out:
  - 1) in a laboratory where certain tests are performed daily;
  - 2) in an accredited laboratory at certain intervals prescribed by this Regulation or more frequently, if the data in the landfill laboratory show that there has been any accident situation or deviation from the parameters defined by the permit.
- All data obtained by monitoring shall be submitted as part of the regular Annual Reports that the Project Holder is obliged to submit to the Environmental Protection Agency.

## 8.2 Measures to be taken in the event of an accident

By applying the aforementioned protective measures, which are carried out in accordance with technical standards in the fields of construction, electrical engineering, technology, and mechanical engineering for the construction of facilities of this type and purpose, with strict application to the relevant regulations and operational instructions, regular technical inspections of the facility, and proper maintenance, accident situations (such as fires, explosions, spills, etc.) are avoided. In the event of accidental situations, emergency interventions of a local character will be carried out, in accordance with the appropriate instructions and Rulebooks. If the accident situations are of a larger scope, the coordination of remediation will be carried out in cooperation with the competent institutions.

### 8.2.1 Accident Prevention and Preparedness Measures

#### 8.2.1.1 Accident Prevention and Preparedness Measures During Construction Works of Waste-to-Energy Plant

The following will be implemented within Elixir Craft, a branch of Eco Energy:

- All contractors and employees involved in the construction of facilities will be trained and familiarized with the necessary procedures and instructions for the work activities, including



the handling of hazardous substances in accordance with their Safety Data Sheets, waste management (both hazardous and non-hazardous), equipment and means, fire protection measures, occupational safety and security measures, as well as environmental protection measures (both preventive and remedial);

- To prevent the leakage of hazardous materials from construction machinery and stored materials, impermeable sheeting and appropriate containers (bundwall) must be placed under construction machinery and temporary storage areas for materials and hazardous chemicals (paints, varnishes, thinners, coatings, etc.), equipment, and tools. Any intervention on the engaged machinery, such as servicing, will be prohibited if contact with hazardous materials has occurred;
- All construction and other materials that may contaminate the environment (various insulating materials, paints, ACP, coatings, thinners, etc.) on the construction site should be stored in closed facilities, with a waterproof floor covering that can be cleaned.
- At the construction site, it is necessary to provide sufficient quantities of absorbents and degreasing agents (sand, zeolite or other sorbent) in case of spillage of harmful substances (petroleum products, oils, chemicals, etc.), all according to the plan of organization and operation of the construction site.
- In case of leakage of small quantities of oil and other fluids, fuel, wastewater (polluted) and the like, it is necessary to carry out emergency localization and remediation. First, take all measures to prevent further leakage, and then sprinkle the place with sand, zeolite or other sorbent. Dispose of the soiled sorbent in special containers and ensure its collection through an authorized operator in accordance with the previously obtained Waste Test Report.
- The management of chemicals/hazardous substances will be carried out in accordance with the manufacturer's recommendations and the associated Safety Data Sheets.
- Only small quantities of hazardous and harmful substances for surface and groundwater and soil may be kept at the site in so-called handy storages, in the amount necessary for daily/weekly construction needs, which must always be adequately secured against leaks/spills.
- When painting, varnishing, and similar works at the location in question, large quantities of paint and varnish must not be used. This is especially true for solvents and other chemicals that evaporate very easily and have a very low lower explosive limit (< 1 vol.%).
- During construction, carry out all necessary measures with flammable materials that can cause fire (boards, beams, slats, flammable chemicals, etc.). Keep such materials away from ignition sources.
- Flammable liquids (gasoline, oil, various oils, anti-corrosion protection agent, paints, etc.) should be stored in special storages protected from fire in accordance with applicable regulations.
- Electroenergetic installation, devices and equipment must comply with the applicable technical regulations by their construction and execution.
- In all places on the construction site where there is a risk of fire, implement protective measures according to the Law on Fire Protection.
- The site administration is responsible for the implementation of these measures. Control of the implementation of these measures is carried out by the site manager, the supervising engineer and the authorized body of the municipality or the Republic.
- Ensure the environment of the welding area by placing appropriate warning signs:
  - FIRE HAZARD



- RESTRICTED ACCESS TO THE UNEMPLOYED.
- Workers who perform complete works must be trained in handling initial fire extinguishers, to know to whom and how to report in case they are unable to extinguish the initial fires.
- Maintain roads in a condition that ensures the safety of traffic and people.
- Organize traffic with vehicles and construction machines in such a way as to reduce the likelihood of traffic accidents, idling, unnecessary dust raising and noise generation;
- Collect and remove sanitary water from the construction site by installing temporary sanitary cabins. The maintenance of these cabins should be entrusted to a specialized authorized company, which will regularly discharge them;
- Upon completion of the construction of the facility, it is necessary to arrange the construction site and remove all remains of the material, as well as construction and other materials.
- The management of construction waste shall be ensured continuously during the execution of works in accordance with the Law on Waste Management and the Construction and Demolition Waste Management Plan, to which the consent of the competent ministry for environmental protection has previously been obtained.
- Construction waste must be separately collected, sorted, transported, stored, prepared for reuse, and/or disposed of.

The construction waste management measures to be applied are as follows:

- Extraction of useful components that are not considered waste in accordance with the law governing waste management and that can be reused for the same purpose for which they were produced (brick, tile, etc.);
- Prevention of mixing of hazardous and non-hazardous waste from construction and demolition and mixing of different types of waste;
- Preventing the dispersal, spillage, discharge of hazardous waste into soil, surface and groundwater and air;
- Determination of places for temporary storage of construction waste at the place of origin, i.e. at the construction site;
- Testing and classification of construction waste;
- Execution of works in such a way as to prevent the generation of waste;
- Encouraging the reuse and recycling of construction waste;
- Keeping records and reporting on the amount and type of construction waste generated, as well as the treatment to which it is subjected.
- Reporting on the types, quantities and characteristics of produced, treated and disposed waste from construction shall be carried out in accordance with the law governing waste management.
- The owner of construction waste is obliged to ensure that hazardous construction waste is first separated on the construction site, to prevent the mixing of hazardous construction waste with non-hazardous construction waste.
- The owner of the construction waste is obliged to obtain a report on the testing of the waste generated on the construction site.
- Waste from construction and demolition should be collected in containers or appropriate bags of sufficient strength and load-bearing capacity for the waste to be collected in them. Containers or bags should be placed on the construction site where the construction works are carried out.
- Containers and bags must be made in such a way that the transport of waste from construction to the waste management plant is carried out without transfer and in a safe manner without danger to human health and the environment.



- Hazardous waste from construction should be collected in closed containers or bags, which possess approvals issued by the competent authority and which are marked in accordance with a special regulation.
- The owner of the construction waste temporarily stores the waste on the construction site where it was created, by storing it separately, by types of construction waste in accordance with the waste catalogue and separately from other waste, in a way that does not pollute the environment.
- Construction waste may be temporarily stored on the construction site until the completion of the works for which the construction permit has been issued, and at the latest until the submission of the application for the issuance of a decision on the use permit.
- The owner of the construction waste is obliged to ensure the transport of that waste to the facility for storage and/or treatment of construction and demolition waste, respecting the waste management hierarchy.
- Transport waste in such a way that it does not mix the sorted waste, or in such a way that it does not pollute other substances so that its reuse, utilization or recycling is not prevented or feasible without disproportionately high costs.
- Transport of hazardous waste from construction should be carried out in accordance with the regulations on the transport of dangerous goods.
- Transport of non-hazardous and hazardous construction waste should be carried out in accordance with the regulations on waste management and road transport.  
The owner of construction and demolition waste may either treat the waste independently or transfer it to an operator who holds a permit for treating this type of waste.
- The costs of treatment, including reuse and/or disposal of construction waste, shall be borne by the owner of the waste.
- Non-hazardous construction waste can be treated with R1 to R12 reuse operations.
- If possible, hazardous construction waste will be treated with disposal operations (D operations) or reuse operations (R operations).
- The possibility will be considered that construction waste determined by the test report to be inert waste can be used to cover landfills, if it meets the limit values of the parameters for the disposal of inert waste.
- Non-hazardous construction waste can be disposed of at inert waste landfills, if it meets the limit values of inert waste disposal parameters.
- Certain types of non-hazardous construction waste may also be disposed of in sanitary landfills of non-hazardous waste, if the waste has been previously treated and if it meets the limit values of the parameters for the disposal of non-hazardous waste.
- Hazardous waste from construction may be permanently stored at the location for which the consent for permanent storage issued by the competent authority of the local self-government unit on whose territory that location is located has been obtained.
- Hazardous waste from construction and demolition can be disposed of at sanitary landfills for hazardous waste, which have a permit issued by the competent authority for the disposal of the specified waste.
- Certain types of hazardous construction waste can be disposed of at landfills for non-hazardous waste that have specially designated cells for the disposal of such hazardous waste, provided that the waste has been pre-treated through surface curing and solidification processes, in accordance with a permit issued by the competent authority.
- All contractors and employees must complete training covering procedures related to waste management.

#### 8.2.1.2 Accident Prevention and Preparedness Measures During Routine Operations

- Fire protection at the plant complex in question is designed in accordance with the applicable regulations of the Republic of Serbia.
- As part of the design and technical documentation within the Preliminary Design, in accordance with the Law on Fire Protection, regulations, standards and norms in the field





of fire protection and the rules of the profession, the document Fire Protection Study and Hazard Zone Analysis were prepared, which define all preventive protection measures.

- All equipment and devices are designed in accordance with the characteristics of the substances with which they come into contact. All installed equipment is duly attested and supplied with the necessary attestation documentation.
- Analysis of the microlocation of the facility from the aspect of fire transmission to adjacent facilities and from adjacent facilities, as well as the possibility of fire and rescue units coming to the intervention and accessing the facilities with a fire intervention vehicle.
- Access to the facilities by a fire intervention vehicle is enabled by local existing roads in the Elixir Prahovo industrial zone and internal roads designed as part of the plant.
- Internal roads can be accessed by all facilities with at least one facade. In accordance with Article 5 of the Rulebook on Technical Norms for the Protection of Storages from Fire and Explosions (Official Gazette of SFRY No. 24/87), and by classifying the storage, the access of the fire engine to this storage is provided from a minimum of 3 sides. The boiler plant can be accessed from 3 sides.
- Access roads have characteristics that satisfy all the requirements of the Rulebook on Technical Norms for Access Roads, Ring Roads, and Arranged Platforms for Fire-fighting Vehicles Near the Facility of Increased Risk of Fire ("Official Gazette of FRY", No.8/95):
  - Load-bearing capacity of the roadway with 130 kN axle load,
  - the minimum width of the roads for one-way movement of the vehicle is 3.5 meters, and for two-way movement 6 meters,
  - Vertical clearance of 4.5 meters,
  - Inner curve radius of 7 meters and outer curve radius of 10.5 meters,
  - Maximum gradient of 6%.
- Within the Waste-to-Energy Plant, a Pumping Station and a fire station (facility W-C04) are planned for rapid intervention at the site. The Elixir Prahovo industrial complex has a trained and equipped environmental protection service, occupational safety, fire brigade, rescue unit (within the fire brigade), physical and technical security, etc. In addition to the aforementioned services at the location in question for firefighting intervention and for the rescue of people and property endangered by fire or other natural disasters, the firefighters from the Fire Department in Negotin, located at Ljube Nešić 3, will respond as the nearest fire brigade. If necessary, additional fire brigades from the surrounding area will also be called upon.
- The fire brigade within the Elixir Prahovo complex is about 3 km away from the Waste-to-Energy Plant. From the moment of receiving the call for intervention and the departure of the fire truck from the garage, the vehicle will arrive at the location in 4-5 minutes.
- Given the distance of the Negotin fire brigade of about 10.5 km and the speed of movement of the fire engine of about 50 km/h, the waiting time for the arrival of firefighters is approximately: The time of 18 minutes to start the intervention is considered favourable and provides effective protection in the event of a fire of higher intensity.
- From the aspect of fire protection, the facilities are designed as separate facilities and as facilities in a row. Separate facilities are designed to be located at a distance from other facilities in the complex at a minimum of 4m, which prevents the transfer of fire from one facility to another. In facilities designed as buildings in a row, measures to prevent fire transmission, such as separation distances on the facade and roof, are provided.
- Requirements for safe installation in Terms of fire and explosion protection measures with a certified Site plan were obtained, Ministry of the Interior, Emergency Situations Sector, Emergency Situations Department in Bor, No. 217-8865/23 of 13/10/2023.
- The required fire resistance of roof structures of 30 min is achieved by fire-resistant coatings for steel. Only the main roof supports (IPE 450) are treated with fire-resistant coatings. The roof that serves as a fire separation has a fire resistance rating of 60 minutes in accordance with the standard SRPS EN 1365-2.



- The Fire Protection Study defines the essential elements for the protection of facilities against fire and explosions so that in the event of a fire:
  - preserve the load-bearing capacity of the structure of the subject facility for a certain period of time;
  - prevent the spread of fire and smoke within the subject facility;
  - prevent the spread of fire to adjacent facilities;
  - enable the safe and secure evacuation of people, i.e. their rescue.
- As a first condition of preventive action, it is necessary to exclude the possibility of finding ignition sources at critical points in the facility.  
To avoid a fire or explosion, it is necessary to remove at least one of the 3 listed conditions that lead to a fire, namely:
  - combustible material (usually flammable gases, liquids or solids...)
  - oxidizer (oxygen or air)
  - sources of ignition are direct causes of fire and can be classified into several groups: heated surface, open flames, sparks of mechanical origin and welding, malfunctions on live electroenergetic installations, atmospheric discharge, etc.If this condition is met a fire cannot occur.

Fire protection measures related to equipping facilities with security systems and devices have been developed based on the following:

1. Rulebook on Technical Norms for Fire Protection of Industrial Facilities ("Official Gazette of the RS", No. 1/2018 and 81/2023)
2. Rulebook on Technical Norms for the Protection of Storages from Fire and Explosions ("Official Gazette of SFRY", No. 24/87)
3. Rulebook on Technical Norms for Fire Protection of Residential and Commercial Buildings and Public Facilities ("Official Gazette of the RS", No. 22/2019)
4. Risk assessments based on the generally accepted EUROALARM method.

Based on the results of the fire risk assessment and the aforementioned regulations for the facilities, the following safety systems were adopted in project documentation:

**A. The entire complex is to be protected by an external hydrant system**

**J. Facility W-C01 Reception guardhouse and administrative building**

- a. Internal hydrant system
- b. Fire detection system
- c. Ventilation of the evacuation staircase through a window in the facade

**K. Facility W-C02 Operational Centre**

- a. Internal hydrant system
- b. Fire detection system
- c. Ventilation of the evacuation staircase through a window in the facade
- d. Gas extinguishing of certain technical rooms

**L. Facility W-C04 Pump station and fire station**

- a. Internal hydrant system
- b. Fire detection system
- c. Stable extinguishing system in the pumping station part

**M. Facility W-C08 Pretreatment and Waste Storage**



- a. Internal hydrant system (in an area where persons can access)
- b. Fire detection system
- c. Methane detection system in the sludge bunker area
- d. Stable extinguishing system
- e. Natural smoke extraction system

## **N. Facility W-C11 Thermal Waste Treatment Plant**

- a. Internal hydrant system
- b. Fire detection system
- c. Stable extinguishing system in the zone around the burner
- d. Natural smoke extraction system

## **O. Facility W-C12 Stabilization and Solidification**

- a. Internal hydrant system
- b. Fire detection system (only in a space accessed by people)
- c. Hydrogen detection system

## **P. Facility U-C02 Maintenance Building and Auxiliary Systems Facility**

- a. Internal hydrant system
- b. Fire detection system
- c. Natural smoke extraction system.

The project defines **the boundaries of fire sectors (SOPs)** in accordance with the adopted degree of resistance, i.e. the calculation of:

- The division of facilities into fire sectors was primarily based on regulations that require the fire separation of specialized rooms. This was done in accordance with the possibilities that allow the smooth operation of the technological process, the fire risk assessment, and the goal of ensuring the effective and safe evacuation of all occupants, while also preventing the spread of fire and smoke within the facilities.
- The construction measures envisaged to prevent the transfer of fire are the limitation of the filling of the waste bunker (max. up to 80% of the volume) to prevent the transfer of fire from one bunker to another or from the bunker to the conveyors transporting waste to the W-C11 facility. In case burning waste is transferred by crane on conveyors, local extinguishing systems on the conveyors are provided.
- The facilities are separated by a fire-resistant concrete wall for at least 120min and connected only by conveyor openings. Fire transmission over the roof is prevented by a fire-resistant roof covering in accordance with the adopted SOP on facility W-C08.
- The return of the flame from the boiler to the bunker is prevented by a technological solution that is an integral part of the boiler technology.
- Within the W-C08 facility, which, due to its primary purpose, was treated in accordance with the Rulebook on Technical Norms for the Protection of Storages from Fire and Explosions ("Official Gazette of the SFRY", No. 24/87), there is an area used for the pretreatment of hazardous and non-hazardous waste (such as shredding of waste). If the area serves other purposes, due to technological requirements, it could not be separated from the storage bunkers by fire protection measures. This room is connected to the bunkers only by conveyor openings, and in the rest, it is separated by a fire-resistant concrete wall for at least 120 minutes. Local fire extinguishing systems are envisaged as a measure to reduce the possibility of fire transmission on these conveyors.



- Resistance of structural elements in accordance with the Rulebook on Technical Norms for Fire Protection of Residential and Commercial Buildings and Public Facilities ("Official Gazette of the RS", No. 22/2019) is defined for the following facilities:
  - **W-C01 Reception guardhouse and administrative building**  
In accordance with the adopted category of the facility (IP1) and the class of the facility (P2), the degree of fire resistance of the facility is II.
  - **W-C02 Operational Centre;**  
In accordance with the adopted category of the facility (NP2) and the class of the facility (P2), the degree of fire resistance of the facility is III.  
The operational centre is located in the immediate vicinity of the boiler plant (10m), so due to the possibility of transferring fire to the roof from a higher to a lower facility, the resistance of the roof covering was adopted in accordance with the adopted SOP III, which is 30min.
  - **W-C04 Pump station and fire station;**  
In accordance with the adopted category of the facility (NP2) and the class of the facility (P2), the degree of fire resistance of the facility is II.  
**The requirement for the resistance of the facade wall exists and is met only in the zone of the pump station, namely fire resistance of 60 min.** This requirement is derived from the standard for stable extinguishing systems SRPS EN 12845.
- The resistance of structural elements for the facility W-C08 Pretreatment and waste storage was carried out in accordance with the Rulebook on Technical Norms for Fire and Explosion Protection of Storages ("Official Gazette of SFRY", No. 24/87) In accordance with Article 4 of the Rulebook, the facility in question, based on its area, belongs to large storages with a high fire load.
- In accordance with the Rulebook on Technical Norms for Fire Protection of Industrial Facilities ("Official Gazette of the RS", No. 1/2018 and 81/2023) defines the resistance of structural elements to facilities:
  - **W-C11 – Waste thermal treatment plant** - there is no requirement for fire resistance of structural elements of the facility
  - **W-C12 – Stabilization and solidification** – Fire resistance of structural elements that support the building and the elements constituting the fire sector is required for at least 30 minutes. This includes construction elements whose failure could not lead to the collapse of the bearing structure or the fire sector's structure, as well as construction elements of the roof's bearing structure, whose failure might lead to the collapse of the remaining roof structure.
  - **U-C02 – Maintenance building and auxiliary systems facility** – The required fire resistance of structural elements that support the building and the elements that define the fire sector must be at least 30 minutes, while there is no specific fire resistance requirement for other building elements.

Considering the need to preserve the process and the value of the equipment, it was determined that the elements at the boundary of the fire sector should have the following fire resistance: fire-resistant walls with a rating of 90 minutes, fire-resistant floors with a rating of 60 minutes, and fire-resistant doors with a rating of 30 minutes (or 60 minutes if the door surface exceeds 3.6 m<sup>2</sup>).

- For evacuation and rescue of persons and materials from the facility in case of fire, it is necessary to define and mark the evacuation routes in the facility in accordance with the Law on Fire Protection ("Official Gazette of the RS", No. 111 of 29 December 2009, 20 of 24 February 2015, 87 of 13 November 2018, 87 of 13 November 2018 - others Laws) and applicable standards in this field.
- Evacuation routes and exits are designed to be marked as easily recognizable and visible. Marking of evacuation routes and exits is provided for by the prescribed signs placed in the most visible places.



- Identification of evacuation routes and exits must not be hindered by placed objects or decoration. Evacuation routes do not lead past fire-explosive and hazardous premises and substances.
- The floors of the evacuation routes are designed to be flat, without protrusions or damage that could cause people to fall, especially during evacuation. They are also non-slip and free from mats that could wrinkle or shift.
- Evacuation exits lead to free space - areas outside the facility, which is large enough to accommodate all evacuees.
- Traditional building materials that provide the required fire resistance will be used as the basic principle for the selection of materials for structures that should be fire resistant.
- The prevention of the horizontal spread of fire on the facade, i.e. the transfer of fire at the border of the fire sectors of the part of the project in question to the rest of the space in the zone of the outer wall, is also achieved by applying a horizontal breaking distance of not less than 1 m, whose fire resistance is equal to the fire resistance of the wall that is perpendicular to the facade.
- The facade (outer) wall is constructed in such a way as to prevent the path of flame between two adjacent floors by performing a vertical construction element whose fire resistance is in accordance with the adopted degree of fire resistance of the facility.
- Wall, ceiling and floor coverings installed on evacuation routes that do not belong to the evacuation corridor (e.g. floor corridors, passages, etc.) must be fire reaction characteristics according to the standard SRPS EN 13501-1.
- All structural elements and fire-resistant doors must be constructed of construction products with fire reaction characteristics according to SRPS EN 13501-1.
- Horizontal breaking distances at the boundaries of fire sectors must meet the requirements regarding the characteristics of reactions to fire, i.e. construction products must be applied according to the standard SRPS EN 13501-1.
- The walls of vertical ducts for accommodation of installations must be fire-resistant for 30 min for facilities with II and III degrees of resistance. The walls of vertical channels must be made of construction products with fire reaction characteristics according to the standard SRPS EN 13501-1.
- The category of technological process was established based on Article 11 of the Rulebook on Technical Norms for Hydrant Fire Extinguishing Network Installations ('Official Gazette of the RS', No. 3/2018);
  - K2 - plants in which flammable liquids of category 3 are used, produced or processed, plants in which explosive dusts are generated by processing with a smouldering temperature of over 350°C or an ignition temperature of over 450°C, pumping plants for liquid substances whose flash point is between 60°C and 100°C, plants in which coal dust is generated, wood chips, flour, powdered sugar, synthetic rubber powder, etc., **large storages**, medium-sized storages for rubber products, facilities over 30 m high, facilities in which more than 500 persons reside, etc.
  - K4 - plants in which non-combustible substances are used, produced or processed, plants in which liquids with a flash point above 300°C are operated, solid substances with a flash point above 300°C and substances processed in a heated, softened or molten state, whereby heat is released accompanied by sparks and flames, melting, casting and metal processing plants, gas-generating plants, internal combustion engine testing departments, **boiler rooms, control buildings in power plants**, plants in which solid, liquid and gaseous fuel is burned, small garages, small storages, facilities in which 100 to 200 persons reside, facilities in which children, elderly persons, immobile patients, etc. and facilities up to 22 m high.
  - K5 - represents the category of the technological process of fire hazard, which includes plants that work with non-combustible materials and cold wet material, for example: plants for mechanical processing of metals, compressor stations, plants





for the production of non-combustible gases, wet departments of the textile and paper industry, plants for the extraction and cold processing of minerals, asbestos and salts, facilities for the processing of fish, meat and dairy products, water stations and **facilities that can accommodate up to 100 persons.**

- For the facility W-C08 Pretreatment and storage of waste, according to the requirements given in the Rulebook on Technical Norms for the Protection of Storages from Fire and Explosion ("Official Gazette of the SFRY", No. 24/87), given the adopted size of the fire sector for the storage part of the facility, **the obligation to install a stable system for timely fire detection and alarm is prescribed.** For other facilities in the complex, the installation needs for automatic fire detection and alarm are adopted in accordance with the results of the risk assessment (Numerical documentation of the Fire Protection Study).
- The project documentation outlines the installation of **addressable central devices for fire detection, alarm, and fire extinguishing management.** The planned central devices are modern, modular, and redundant, with the capability to monitor and manage fire extinguishing systems across multiple sectors.
- The installation of the central device in the operational centre in the command room, in the part of the entrance hall of the administrative building with the guardhouse and in the technical room of the waste storage is planned. In addition to the aforementioned central devices of the fire detection and alarm system, the project documentation also envisages the installation of central devices at level +8.40 of the waste storage, which serves exclusively for the management of the Novec 1230 MCC gas extinguishing system of the room, as well as the installation of a central device in the operational centre at level +8.16 for the management of the MCC extinguishing system of the room of the operational centre.
- In addition to the previously mentioned facilities, the gas extinguishing system is managed from the DCS room in the operational centre. This system will be controlled via a fire alarm switchboard located in the control room, which not only handles fire detection and alarms but also manages the fire extinguishing system.
- In addition to the central device in the command room of the operating centre, the installation of software for graphic monitoring of the system is envisaged, which allows the user an unlimited number of graphic folders and management of all system functions. The software aims to indicate to the user, through integrated graphic maps, the position of the elements where the alarm, shutdown error or any other protocol-defined event occurred.
- All central devices of the fire detection and alarm system will be connected via a single-mode optical cable to enable the entire fire alarm system to function as a unified entity.
- Depending on the purpose, possible causes of the outbreak, the first manifestations of the occurrence of fire, different types of detection were selected:
  - **Point detectors—optical addressable detectors** - are installed in rooms where smoke is expected as the first indication of fire. Additionally, in rooms where smoke, water vapour, or other vapours may be present during normal operations, combined fire detectors are planned. These combined detectors function as thermal detectors during the facility's operating hours and switch to smoke detection after hours.
  - **Flame detectors** - Due to the mode of fire manifestation, the installation of IR 3 flame detectors is planned in some facilities. This detector reduces false alarms and is widely used in industrial and commercial facilities. IR 3 also offers 3-4 times the distance of any conventional IR or UV/IR detector. The envisaged type of flame detector is intended for both indoor and outdoor installation.
  - **IC flame detectors** - Due to the manner of fire manifestation, the installation of IC temperature change detectors, i.e. hot parts of materials above 100°C, is planned in the waste pretreatment and waste storage facility. The IC temperature change detector responds to the infrared part of the spectrum. The detected radiation is led through one filter to an optical-electric transducer that gives an electrical signal. In



- case of heavily soiled environment, it is also necessary to consider the option of blowing compressed air into the detector housing itself to clean the optical part.
- **Digital thermo-sensitive cable** – In facilities where moisture and high humidity are present, the installation of a digital thermo-sensitive cable with a reaction temperature of 78 °C will be envisaged. The thermo-sensitive cable is connected to the monitored input of the addressable module of the fire alarm system, or to the controller for the connection of the digital temperature-sensitive cable.
  - **Line smoke detectors** - If the mounting height is not suitable for installing optical (point) smoke detectors, the design includes the installation of linear fire detectors with a controller. The linear detector consists of a controller, receiver, and reflector.
  - **Aspiration Smoke Detector (Suction Smoke Detectors)** - Smoke detection in the initial phase of the fire is a very important factor that provides additional time that can be used to prevent damage in specific parts of the facility. The principle of operation of suction detectors is based on constant air sampling through sampling holes, after which the air is transported to a high-sensitivity laser smoke detector and analysed for the purpose of detecting smoke particles.
  - In addition to the mentioned types of detection, the project documentation includes the installation of **manual fire alarm** call points in passageways, evacuation routes, and corridors. The purpose of the planned manual detectors is manual activation by the person who noticed the fire, and the automatic fire detectors have not yet been activated. In the case of requests for external installation of manual detectors, the project documentation will provide manual detectors in the appropriate degree of IP protection (according to the standard SRPS EN 60529:2011 Degrees of protection of electrical equipment achieved using protective enclosures (IP code) (identical to IEC 529:1989).
  - The installation of **addressable input/output modules** is also envisaged to manage and accept/process data. Modules that are intended to activate executive functions from the fire detection and alarm system must be connected to the fire function loop.
  - In all facilities and on all floors in the facilities, sirens or alarm sirens with a flash are provided in such a way that a minimum sound level of 65dB or 10dB above the noise level is provided.
  - In the waste storage and pretreatment facility, the installation of alarm flashers is also planned, intended to signal the activation of the fire extinguishing system.
  - In addition to its standard function of activating light-sound alarm devices, the siren alarm switchboard can activate or stop other processes relevant to the system's functionality, the facility's operations, and the safety of personnel and equipment. Upon activation of the automatic fire detection and alarm system, the defined executive functions are as follows:
    - Activation of the natural smoke and heat extraction system of the stairwell
    - Lowering the elevator to the evacuation level
    - Sending alarm signals via telephone alarm apparatus
    - Activation of the natural smoke and heat extraction system
    - Activation of the water curtain at the border of pretreatment of non-hazardous waste and the reception bunker for non-hazardous waste
    - Extinguishing the shredder after detecting a fire on the shredder or in the waste bunker
    - Stopping conveyor belts in case of fire on the shredder or in the waste bunker and waste pretreatment
    - Extinguishing the hazardous waste shredder after the completion of the initiated process in the event of a fire in the waste bunker and waste pretreatment
    - Activating the burner extinguishing
    - Activating the transporter shutdown
    - Activation of extinguishing - monitor
    - Activating the crane protection
  - In addition to the standard function of the system, which is the activation of light-sounding alarm devices, i.e. sirens, sirens with a flash and light warning panels, the fire extinguishing



system control panel has the ability to activate or stop other processes relevant to the functionality of the system, the functionality of the facility and processes that would affect the safety of personnel and equipment in the facility. Blockage of Emergency Ventilation: Emergency ventilation systems are designed to remove combustion products and extinguishing agents from the room. To ensure that the extinguishing agent remains effective and continues to address any potential residual hot spots, the emergency ventilation is automatically blocked for a specified period after the fire is detected and the extinguishing system is activated. This blockage prevents the premature expulsion of the extinguishing agent before it has had sufficient time to act. The emergency ventilation blockage is automatically engaged by the central system upon receiving a fire signal and remains in effect for 30 minutes. After this period, it can be reactivated by pressing the red mushroom button located on the emergency ventilation cabinet.

- To mitigate or completely eliminate false alarms, the project envisages that the entire fire detection system has an integrated false alarm verification system that will, through complex algorithms and a series of predefined rules, enable users to eliminate the controlled occurrence of alarm triggers and reduce the number of false alarms to a minimum. The system for automatic detection, alarm and fire extinguishing management requires a detailed alarm plan in which procedures must be established during and outside working hours, i.e. in the case of the presence of employees and in the case when there is no one in the protected area. Directly adjacent to each central device, the following items must be placed:
  - Scheme of the alarm plan
  - Arrangement of fire detection and extinguishing zones
  - Operating instructions of the main fire extinguishing centre
  - System control notebook
- In addition to the alarm procedures related to the operation of the central fire detection, alarm, and fire extinguishing management system, the facility-wide alarm plan also includes procedures for:
  - Warning other persons that are present and evacuating them
  - Involving the persons on duty in extinguishing the fire
  - Alarming the nearest professional fire brigade
  - Alarming a person who has special duties in connection with fire protection.
- **Hydrogen sulfide (H<sub>2</sub>S) detection** is planned in the areas with storage tanks, the liquid waste storage area 3, and the transfer stations for IBC containers/barrels, as well as in the sludge storage and dosing equipment area, and the hazardous waste pretreatment area, due to its highly toxic properties. Space for sludge storage and dosing equipment: When the concentration reaches 30 ppm, ventilation is activated at a lower speed, and an intermittent alarm signal with a flashing siren is triggered. At a concentration of 50 ppm, ventilation increases to a higher speed, and a continuous alarm signal with a flashing siren is activated. Additionally, light warning panels displaying "GAS DO NOT ENTER" and "GAS LEAVE THE ROOM" are turned on.  
IBC Storage and Barrels, and Rooms for Fuel and Non-Combustible Liquid Tanks: In these areas, ventilation operates continuously. If the concentration reaches 50 ppm, a continuous alarm siren with a flash will be activated, along with light warning panels displaying "GAS DO NOT ENTER" and "GAS LEAVE THE ROOM".  
Hazardous Waste Pretreatment: At a concentration of 30 ppm, ventilation control/flap opening will be activated, and an intermittent alarm siren with a flash will sound. When the concentration reaches 50 ppm, a continuous alarm siren with a flash will be activated, along with light warning panels displaying "GAS DO NOT ENTER" and "GAS LEAVE THE ROOM."
- In the facility W-C08, a **methane ventilation and detection system (CH<sub>4</sub>)** are installed in the area for sludge storage and dosing equipment. Given that the amount of methane emissions from the sludge is unknown, it is not possible to calculate the required number of air changes in the space to keep the methane level below the LEL (Lower Explosive



Limit). Therefore, a methane detection system is installed in this area. The gas detector is mounted on the aspiration system pipe. For methane detection in the sludge bunker, an aspiration system designed for industrial environments and contaminated areas is used. The proposed methane detector ( $\text{CH}_4$ ) monitors the gas within the range of 0-100% LEL. At 10% of the LEL, the space will be inertized, that is, nitrogen will be injected and an intermittent tone will be activated via an alarm siren with a flasher. At 40% of the LEL, the power supply to the sludge bunker will be turned off and a continuous signal will be activated via an alarm siren with a flasher, as well as an alarm flasher will be activated via an alarm siren with a flasher and light warning panels displaying "GAS DO NOT ENTER", i.e. "GAS LEAVE THE ROOM". Executive functions are defined in the explosive gas detection project.

- Within the stabilization and solidification facility, a **hydrogen ( $\text{H}_2$ ) detection system** is also planned, with alarm functions set at 10% and 25% of the Lower Explosive Limit (LEL). The facility will include the installation of a central unit for detecting explosive gases and vapours. Stationary fire detectors are to be installed at all locations where there is a potential risk of gas leakage, particularly in front of and around intake points of ventilation ducts, valves, joints, etc. All detectors will be equipped with appropriate Ex protection. Warning of the presence of an increased concentration of hydrogen will be carried out by sound signals via alarm sirens with flash distributed on the outside above the entrance door to the facility, as well as inside the facility. The installation of light panels marked "GAS DO NOT ENTER" is planned at the entrance to the room, while inside the room, above the door, light panels marked "GAS LEAVE THE ROOM" will be installed. These panels are activated when the methane concentration reaches 25% of the Lower Explosive Limit (LEL). The system's executive functions include: activating evacuation sirens with a flash via controlled outputs from the switchboard, activating the light panels marked "GAS DO NOT ENTER" and "GAS LEAVE THE ROOM," switching on ventilation at 10% of the LEL, and switching off the power supply at 25% of the LEL. The fire alarm system will receive a fault signal, a Threshold I alarm, and a Threshold II alarm.
- **An ammonia detection system ( $\text{HN}_3$ )** for monitoring the concentration of ammonia is provided within the facility where the ammonia water tank is located and near the SCR module in the thermal waste treatment plant.  
Since ammonia is lighter than air, an ammonia detector is installed below the roof of the bund wall where the storage tank is located. Additionally, detectors are provided near the transfer pumps situated next to the storage tank, as well as near joints, valves where there is a high likelihood of ammonia leakage. Furthermore, alarm warning panels with the inscription "GAS DO NOT ENTER" and an alarm siren with a flasher are provided on the bund wall panels to inform personnel about the detection of ammonia toxicity.  
In the vicinity of the SCR module located in the thermal waste treatment plant, the project documentation provides for ammonia detection above the skid with valves, since ammonia, as previously mentioned, is lighter than air. Additionally, alarm warning panels marked "GAS LEAVE THE ROOM" and an alarm siren with a flasher are provided to notify personnel of toxic gas detection.
- **Carbon monoxide ( $\text{CO}$ )** detection is also envisaged in the garage area of fire trucks within the pump station and fire station. In emergency conditions, such as when many vehicles with internal combustion engines are operating or if there is a malfunction in the ventilation system, carbon monoxide concentrations may increase. The detection system is designed to identify carbon monoxide in the event of such incidents. When the central device receives this information, it processes the data and activates both visual and audible alarms if the gas concentration exceeds the preset alarm levels through the fire alarm control panel. If a concentration of 250 ppm of carbon monoxide is detected in the garage, the system will also trigger the executive function to open the garage door to allow for air exchange. In addition to the above, the project documentation also includes sending signals from the relay outputs of the central carbon monoxide detection device to the inputs of the designated addressable input/output module of the fire detection and alarm system.



The signals to be forwarded from the carbon monoxide detection system to the fire alarm system include: Alarm I threshold (100 ppm), Alarm II threshold (250 ppm), and error signals.

- In accordance with the Rulebook on Technical Norms for the Hydrant Fire Extinguishing Network ("Official Gazette of the RS", No. 3/2018) all facilities must be covered by an external and internal hydrant network. The amount of water in the installation of the external and internal hydrant fire extinguishing network of a facility to be protected is defined according to:
  - the degree of the facility structure resistance to fire;
  - the category of technological process according to the fire risk to which the facility is classified (K1 to K5 and K1E);
  - volume of the facility.
- Based on the calculated water requirements for each facility, the minimum required amount of water was established. This was used to determine the total amount of water needed for the hydrant network to operate for 120 minutes.
- The internal hydrant network must have a minimum water flow at the most unfavourable place in accordance with the following table:

Height of facility (m)	Up to 22*	From 22 to 40*	From 40 to 75*	Above 75
Water quantity [l/s]	5	7.5	10	12.5

- The above results in the number of internal and external hydrants for simultaneous operation for each facility as shown in the table below:

Facility designation	Facility name	Amount of water internal network [l/s] (number of hydrants)	Amount of water external network [l/s] (number of hydrants)	Water quantity [l/s]
W-C01	W-C01 Reception guardhouse and administrative building	5 (2)	15 (3)	20
W-C02	Operational centre	5 (2)	10 (2)	15
W-C04	Pump station and fire station	5 (2)	10 (2)	15
W-C08	Pretreatment and waste storage	5 (2)	25 (5)	30
W-C11	Waste thermal treatment plant	7.5 (3)	20 (4)	27.5
W-C12	Stabilization and solidification	5 (2)	15 (3)	20
U-C02	Maintenance building and Auxiliary systems facility	5 (2)	15 (3)	20

- The W-C08 facility is designed in such a way that the process is fully automated, and it is not provided with human access due to the layout of the bunker, except in the part where there are technical rooms, waste pretreatment rooms, liquid waste storage rooms. The layout of hydrants for this facility will be such that it is possible to distribute the envisaged amount of water to the internal and external hydrant network, but also to have enough external hydrants so that all the amount of water is used only for external hydrants.
- A facility that has limited human access is a W-C12 solidification facility. Non-combustible material is stored in this facility. The internal hydrant network will be provided in the part of





the facility that people can access, while the part where people cannot physically access will remain uncovered. In all other facilities, the internal hydrant network will cover the entire surface of the facility.

- The lowest pressure on the fire extinguishing nozzle in the most unfavourable place must not be less than 2.5 bar.
- Above-ground hydrants are installed on the water supply network (pipelines of the external hydrant network). All overhead hydrants must comply with the standard SRPS EN 14384, which is proved by an appropriate document of compliance in accordance with a special regulation governing this area.
- In the immediate vicinity of the external hydrant intended for immediate fire extinguishing, there must be a cabinet with fire hoses of the required length, nozzles and other firefighting fittings (reducers, dividers, etc.).
- The distance of the external hydrant, intended for immediate extinguishing, from the wall of the facility to be protected is at least 5 m, and at most 80 m.
- The internal hydrant network must be constructed in such a way as to enable safe and efficient handling of internal hydrants, as well as their use for immediate fire extinguishing.
- Internal hydrants and associated equipment that comply with SRPS EN 671-2 are used for the internal hydrant network, which is proved by an appropriate document of compliance in accordance with a special regulation governing this area.
- Galvanized steel pipes with a minimum internal diameter of Ø52 mm must be used for the internal hydrant network.
- Pipelines of the internal hydrant network that are exposed to impacts (such as those caused by moving motor vehicles in garages, storage areas, etc.), freezing of water, and similar influences must be protected from the harmful effects of these factors.
- When using internal hydrants and related equipment according to SRPS EN 671-2, the spacing of wall hydrants is determined so that the entire area is covered by at least one water jet, considering a fire hose length of 15 meters or 20 meters and a jet length of 5 meters.
- Fire hydrant cabinets should be installed at a height of 1.50 meters from the floor to the hydrant valve and marked with a fire hydrant symbol, using the letter H. The cabinet should be equipped with a fire hose with a diameter of 52 mm and a nozzle with a diameter of 12 mm.
- The waste-to-energy plant is supplied with technological-hydrant water from the existing Elixir Prahovo complex, and from the newly designed pit housing the shut-off valve and water meter.
- The connection pipeline for the technological-hydrant water is DN200 PN10 with a pressure rating of up to 5 bars.
- The technological water also supplies the fire water reservoir (W-C03, with a capacity of 1200 m<sup>3</sup>), which is equipped with pumps of sufficient capacity to support all fire protection equipment (hydrants + fixed extinguishing systems). The reservoir is sized for two hours of autonomous firefighting and does not impose a load on the complex's connection. A replenishment rate of 20 l/s is provided, which can fill the reservoir in less than the prescribed 36 hours.
- The required water flow will be ensured by the simultaneous operation of 5 external fire hydrants with a diameter of DN80 mm, each with a capacity of 5 l/s, and 2 internal fire hydrants with a diameter of DN50 mm, each with a capacity of 2.5 l/s, resulting in a total flow rate of:  $Q_f = 5 \times 5 + 2 \times 2.5 = 30$  l/s, in accordance with the Rulebook on Technical Norms for Hydrant Fire Extinguishing Network Installations ("Official Gazette of the RS", no. 3/2018).
- A sufficient number of external, above-ground fire hydrants with a diameter of DN80 mm, a capacity of 5.0 l/s, a height of H = 1900 mm, and a breakable column, are designed for the external fire protection technological-hydrant ring network. This setup ensures efficient



and reliable fire extinguishing in the event of a fire occurring in any part of the facility or location.

- For the internal hydrant network needs, the facilities will be supplied from the external hydrant network of the complex.
- In accordance with the applicable fire safety regulations and considering the purpose and size of the facility, the installation of an internal fire protection network is planned, with the capacity to simultaneously operate two internal hydrants (2x2.5 l/s). Additionally, an external ring hydrant network is planned, with the capacity to simultaneously operate five external hydrants (5x5.0 l/s), resulting in a total capacity of 30.0 l/s.
- After the 1200 m<sup>3</sup> fire water reservoir, of which 216 m<sup>3</sup> is allocated for the hydrant network, and the pressure-boosting unit (Q = 30 l/s, H = 50 m, N = (2 operational + 1 standby) x 15 kW) with a 1500 l hydro-pneumatic tank, located in the pump station, the hydrant water for the entire location is distributed through a ring-type network with above-ground DN80 hydrants at the specified distance. A DN65 connection is branched off from the ring for the internal hydrant network of the facilities.
- An internal hydrant network with a capacity of 5 l/s (2x2.5 l/s) has been installed in the facility, with a minimum pressure of 2.5 bar at the last hydrant connection.
- Fire hydrants with a diameter of DN50 are located in wall-mounted tin cabinets (marked 'H'), positioned in visible, easily accessible, and impact-resistant locations. The hydrants are installed at a height of 1.5 meters from the floor.
- In the facility W-08, hydrants are installed only on the ground floor of the facility with a hose length of 20 m.
- In accordance with the applicable regulations, the requirement for a stable fire extinguishing system applies only to the W-C08 facility for waste pretreatment and storage. This requirement is outlined in the Rulebook on Technical Norms for Fire and Explosion Protection of Storages ("Official Gazette of the SFRY", no. 24/87).

Due to the specific technology and geometry of the space, the facility cannot be divided into fire sectors with areas compliant with the requirements of Article 19. Therefore, automatic fire detection and extinguishing systems are provided within the facility to avoid limitations on the size of fire sectors. For other facilities, the need for a stable extinguishing system is defined based on the fire risk of the facility.

- A stable fire extinguishing installation will consist of the following systems:
  - Stable water/foam fire extinguishing system and
  - Steady gas fire extinguishing system Novec 1230.
- The primary standards used for designing the system and calculating the required amount of water are SRPS EN 12845 "Fire Extinguishing Installations – Automatic Sprinkler Systems – Design, Installation, and Maintenance" and SRPS CEN/TS 14816 "Fire Extinguishing Installations – Water Spray Systems – Design, Installation, and Maintenance".
- For the purposes of the foam fire extinguishing system, the standard SRPS EN 13565-2 "Fire extinguishing installations – Foam extinguishing systems – Part 2: Design, execution and maintenance was used.
- In cases where certain hazard classifications are not addressed by the aforementioned standards, guidelines from VdS and NFPA standards were used. VdS standards 4001, 2108, and 2109 were also utilized as supplementary standards (support) for design, as they are considered the "most similar" to SRPS EN 12845, SRPS CEN/TS 14816, and SRPS EN 13565-2.
- The stable water/foam fire extinguishing system is divided into 10 extinguishing zones, with each zone being controlled by one alarm control valve (except for extinguishing zone 3.2, which is controlled by a solenoid valve supplied from extinguishing zone 3). The project includes the following extinguishing zones:

- **EXTINGUISHING ZONE 1 - W-C04 FIRE STATION AND PUMP STATION**



Two identical sprinkler pumps (working and spare) are provided for diesel-powered fire extinguishing and one electric "jockey" pump for maintaining pressure in the system. During the operation of the diesel pumps, adequate ventilation of the pumping station is provided, in order to supply the air necessary for the combustion of the diesel engine.

- **EXTINGUISHING ZONE 2 - W-C08 PRETREATMENT and WASTE STORAGE**  
Receiving hoppers for non-hazardous waste, receiving hopper for hazardous waste, mix hopper, hopper for non-hazardous waste, hoppers for hazardous waste and hopper of prepared waste  
A total of 4 monitors are provided for the protection of waste storage bunkers, 2 of which are in operation while the remaining two are spare.
- **EXTINGUISHING ZONE 3 - W-C08 PRETREATMENT and WASTE STORAGE**  
**PRETREATMENT OF non-hazardous waste**

In the pretreatment of non-hazardous waste, a wet sprinkler system is provided to protect the space itself. The pipe mesh with nozzles is filled with water and installed under the roof. Activation of this system is automatic due to rupture of the nozzle ampoule at elevated temperature.

The shredders themselves have their own local spark extinguishing and immersion systems that are part of the system's operation technology itself and are not covered by this project.

- **EXTINGUISHING ZONE 3.2 - W-C08 PRETREATMENT AND WASTE STORAGE**  
As an additional level of protection, i.e. reducing the possibility of transferring fire from one place to another, a local system for the protection of this opening for the insertion of shredded waste into the reception bunker for non-hazardous waste is envisaged. Activation of the extinguishing zone 3.2 is automatic. Activation of this system is a combination of automatic due to the rupture of the ampoule on the nozzle at elevated temperature, automatic and manual activation depending on the operator's decision. Activation of manual activation is also possible and depends on the operator's decision.
- **EXTINGUISHING ZONE 4 - W-C08 PRETREATMENT AND WASTE STORAGE**  
Crane track axis E and **SHUTDOWN ZONE 4.1 - W-C08 PRETREATMENT AND WASTE STORAGE** Crane track axis A  
In order to protect the horizontal steel structure for the crane, a drainage system with spray nozzles is provided. Activation of this system is a combination of automatic and manual activation and depends on the operator's decision.
- **EXTINGUISHING ZONE 5 and ZONE 6 - W-C08 PRETREATMENT and WASTE STORAGE Movable floors**  
In order to protect the moving floors towards the W-C11 facility, a drainage system with spray nozzles is provided. The activation of this system is a combination of automatic and manual activation and depends on the operator's decision.
- **EXTINGUISHING ZONE 7 and EXTINGUISHING ZONE 8 -W-C11 THERMAL WASTE TREATMENT PLANT BURNERS**  
Two drain check valves with spray nozzles are provided for the protection of the area around burners 1 and 2 (extinguishing zones 7 and 8). The activation of this system is a combination of automatic and manual activation and depends on the operator's decision.

- Hydrants and hydrant equipment must be regularly inspected, kept in a clean and tidy condition and kept in the necessary book of records, which must be made available at the request of the competent inspection authority:
  - pressure and flow measurement: every 6 months,
  - inspection of all devices and fittings: at least once a year.
- At the request of the investor, the server rooms and electrical rooms where equipment of high value and importance for the preservation of the technological process is located will be protected by a stable gas extinguishing system NOVEC 1230, as follows:



- **W-C08 Pretreatment and waste storage**
    - o MCC of all rooms
  - **W-C02 Operations Centre;**
    - o MCC of all rooms
    - o DCS of all rooms
- 
- The extinguishing agent is gas FK-5-1-12 which is commercially named Novec<sup>TM</sup> 1230. The system is designed in accordance with the standards SRPS EN 15004-1, SRPS EN 15004-2 and the manual for design, installation, operation and maintenance of the equipment manufacturer Kidde Engineered Fire Suppression System.
  - Novec<sup>TM</sup> 1230 gas fire extinguishing systems are designed as "total flooding system" systems that fill the entire volume of the said rooms and to retain the appropriate gas concentration for the selected time.
  - The activation of the system is carried out automatically, through the fire alarm and fire extinguishing control system. In the event that the automatic fire alarm fails completely, there is also a manual mechanical actuator on the pilot bottle with which the system can be activated.
  - The person who performs manual activation must first check whether the entire staff has left the protected area because during manual activation there is no so-called tensile time, but the gas is immediately discharged into the protected area.
  - All equipment used must be designed and tested to operate in a temperature range of -20°C to 55°C. Upon completion of the extinguishing, the cracked gas must remain in the protected area for a minimum of 10 minutes. After that, the space will be ventilated for 60 minutes.
  - The selection of mobile fire extinguishing equipment was made on the basis of the classes of fires that may occur in the facilities in question.
  - Mobile equipment consisting of portable handheld appliances with dry powder, marked "S" with a capacity of 9 kg and "CO<sub>2</sub>" with a capacity of 5 kg is intended for extinguishing initial fires.
  - The number of fire extinguishers is determined on the basis of the fire load on the surface of the area of the facility to be protected. In accordance with the geometry of the facility and respecting the rule that the user must not be more than 20 m away from the fire extinguisher, 15 fire extinguishers are adopted in the facility in question.
  - Place the initial fire extinguishers in a visible and accessible place. In the case of hand-held appliances, place them at a height of not more than 1.5 m.
  - Fire extinguishers should be regularly maintained, cleaned of dust and dirt. The correctness control should be performed every 6 months, and specialized services should be hired for the control. It is recommended to introduce records of cartons on performed tests, replacement of filling or replacement of parts.
  - Despite the fact that the apparatus contains instructions for use and its use, it is necessary for persons working in the facility to educate and perform demonstration exercises, in order to be able to use the apparatus properly and efficiently and extinguish the initial fire at the critical moment, because the efficiency of the use of the apparatus largely depends on the education of employees. Therefore, it is necessary to familiarize all persons with the most necessary facts about fire and fire-fighting technique and to hold extinguishing drills from time to time, and also to make a plan and program of fire-fighting actions.
  - For better visibility and visibility, operating boards for initial fire extinguishers can be placed next to the extinguisher or in fire hazard areas.

In accordance with the requirements of Article 71a of the Regulations on technical standards for fire and explosion safety of establishments and facilities for flammable and combustible liquids and on storage and flow of flammable and combustible liquids („Official Gazette of the Republic of Serbia “, nos. 114/2017 and 85/2021) the above-ground tanks for the storage of liquid waste are located in a building W-C08 that meets the following requirements:

- It is separated from other rooms by horizontal and vertical partitions reinforced with concrete and fire resistance doors for 120 minutes;



- Considering the position of the room in the facility, safe relief due to the occurrence of an explosion is provided on the facade wall;
- Forced ventilation with at least five air changes per hour is provided in the room;
- The windows and doors of the room open to the outside;
- The floor is made of non-combustible impermeable material.
- The tanks will be located in a concrete waterproof bund wall. Leaked contents from the bund wall will be collected in the collection pit from where they will be returned to the tanks by the pump.
- The room contains two tanks of 24m<sup>3</sup> each, which is a total of 48m<sup>3</sup>, and at the same time the maximum allowed amount of combustible liquids in one room is intended to accommodate the tank.
- In accordance with Article 8, an above-ground tank, i.e. a construction facility for the accommodation of above-ground tanks must be provided with at least one access road for firefighting vehicles at a distance from which a safe firefighting intervention is possible, built in accordance with the regulation governing this area.
- Connection of vehicles to hydrants must be provided on the access road for firefighting vehicles.
- At 21 m from the facade wall of the room where the tanks are located, there is a fire truck access road.
- In accordance with Article 71b of the Rulebook, the following distances are provided:

Distance from	Required distance [m]	Achieved distance for the first tank group [m]
Public road and boundaries of the plot that does not belong to the plant.	7.5	> 65.5
Facility that does not belong to the plant referred to in Article 3, paragraph 1, item 5, and which are located on the plot that belongs to the plant.	7.5	31.6

- According to Article 29 of the aforementioned Rulebook, the distance between two tanks, regardless of the structure of the tank, must not be less than 1/3 of the sum of their diameters.
- The diameters of the tank are 3m, so based on that the minimum required distance between the tanks is 2m.
- A stable explosive gas detection system must be installed in the rooms for the accommodation of above-ground tanks.
- The room for the accommodation of above-ground tanks must be protected by a hydrant network with at least two standard hydrants.
- The above-ground tank with combustible liquids must be protected by at least two mobile fire extinguishing devices with a capacity of filling 9kg of powder or other appropriate means, and several above-ground tanks must be protected by two such devices for every two tanks. In the present case, this would mean that two mobile fire extinguishing devices should be installed in the liquid waste storage room.
- In accordance with Article 74, for access to the tanks, free space must be provided in all directions around the tank at least 1m.
- 114/2017 and 85/2021);
- For combustible liquids stored in the room, which is separated from the rest of the building by fire-resistant walls for 120 minutes, the permissible amount of a group of containers is 48,000 liters.
- The containers in the subject facility are stored in three groups so that Group 1 has a quantity of 8,000 liters, while Group 2 and 3 have quantities of 20,000 liters each.
- In all groups, the containers are stored in two levels up to a height of 2.7 m.
- Only undamaged and properly packed containers can be stored in a closed room.





- The containers are stored in a group, so that the nearest container must not be less than 1m away from the load-bearing beams of the facility, steel ropes, supports and from water spraying systems or other extinguishing systems.
- The mutual distance of the group of containers must be at least 1m horizontally and vertically so as not to jeopardize the strength and stability of the containers.
- The rest of the room is intended for the storage of non-reusable waste in accordance with technological requirements. All storage vessels are in accordance with the law and by-laws governing this area.
- The maximum allowed storage height of combustible liquid containers can be a maximum of 4.5m.
- The storage of these containers is provided for on the ground floor of the facility in accordance with the requirement referred to in Article 96 of the Rulebook on Technical Standards for Fire and Explosion Safety of Existing Facilities and Facilities for Flammable and Combustible Liquids and on the Storage and Transfer of Flammable and Combustible Liquids ("Official Gazette of the RS", No. 114/2017 and 85/2021), while the distance of the room or building in accordance with Article 97 of the Rulebook:

Distance from	Required distance [m]	Achieved distance for the first tank group [m]
Public road and boundaries of the plot that does not belong to the plant	7.5	>105.5
Facility that does not belong to the plant referred to in Article 3, paragraph 1, item 5, and which are located on the plot that belongs to the plant	7.5	>7.5
Other facilities using flammable and combustible liquids and flammable gases	7.5	10.2

- In accordance with the requirements of Article 98 of the aforementioned Rulebook, the vessels are placed in a room within the construction facility that meets the following requirements:
  - It is separated from other rooms by horizontal and vertical partitions made of solid construction material and a fire resistance door of 120min;
  - The roof of the room is made of lightweight material (maximum mass per unit area of 150 kg/m<sup>2</sup>), which ensures safe relief due to explosion;
  - Forced ventilation with at least five air changes per hour is provided in the room;
  - The windows and doors of the room open to the outside;
- All containers of hazardous materials that have the potential to damage and leak liquid hazardous materials will be stored in appropriate standard portable tanks. The floor of the room is impermeable from the joining of the floor and the wall to a height corresponding to the lowest point of entry. It is designed from non-welding material with a slope from the entrance door to the opposite wall, along which there is a channel with a slope of 2% in the direction of the collection point of spilled liquids.
- The transfer of flammable and combustible liquids from one vessel to another or from tanks to tanks in a technological process in a closed room in a building or in the open, as well as from one auto-tank to an above-ground or underground tank in places where only one auto-tank is provided with access, is carried out by means of a pump at a designated and equipped flow point.
- The place of transferring must comply with the requirements of Article 115a of the Regulations on technical standards for fire and explosion safety of establishments and facilities for flammable and combustible liquids and on the storage and discharge of flammable and combustible liquids („Official Gazette of the Republic of Serbia “, No. 114/2017 and 85/2021) in terms of location and safe placement.



- As an exception to the requirement in Article 115a, the place of discharge must be at least 7,5m away from the public road, the border of the adjacent land and the facility that does not belong to the plant referred to in Article 3, paragraph 1, item 5, and are located on a plot belonging to the plant.

Distance from	Required distance [m]	Achieved distance [m]
Public road and boundaries of adjacent land	7.5	>78.2
Facility that does not belong to the plant referred to in Article 3, paragraph 1, item 5, and which are located on the plot that belongs to the plant oja pripada postrojenju	7.5	>7.5
The nearest wall of the building intended for storage of vessels	7.5	10.2
Other facilities using flammable and combustible liquids and flammable gases	7.5	10.2
Public railway track for electric and other traction	20	>20m

- In accordance with Article 117 about technical standards for the fire and explosion safety of establishments and facilities for flammable and combustible liquids and for the storage and flow of flammable and combustible liquids („Official Gazette of the Republic of Serbia“, No. 114/2017 and 85/2021) the parts of the hatchery serving to connect the transport tanks shall be above ground.
- In accordance with Article 118 for the access of transport tanks to the connection point at the transfer point for the transfer of flammable and combustible liquids, there must be an access road that is an integral part of the transfer point. The length of the access road must be without slope and twice the total length of the connected tanks. The part of the access road, which corresponds to the length of the connected transport tanks increased by at least 12m on both sides of the transferring device, must not be in a curve.
- The part of the access road must be concreted, visibly marked and dimensioned according to the planned traffic, and the movement of the vehicle must be in one direction, all in accordance with the requirement of Article 119 („Official Gazette of the Republic of Serbia“, No. 86/2015).
- According to Article 118, for the access of transport tanks to the connection point at the transfer point for the transfer of flammable and combustible liquids, there must be an access road that is an integral part of the transfer point. The length of the access road must be without slope and twice the total length of the connected tanks. The part of the access road, which corresponds to the length of the connected transport tanks increased by at least 12m on both sides of the transferring device, must not be in a curve.
- The part of the access road must be concreted, visibly marked and dimensioned according to the planned traffic, and the movement of the vehicle must be in one direction, all in accordance with the requirement of Article 119.
- According to the requirement referred to in Article 121, spilled liquids may be discharged only into the technological sewer, and their acceptance can be ensured by special vessels from which the spilled liquid is discharged into the designated area.
- The pump and its equipment must be constructed and approved for transferring flammable and combustible liquids.
- In accordance with Article 136, the transferring point must be protected from heat sources by a hydrant network and mobile fire extinguishers in accordance with Article 135.
- The hydrant network of the transfer point consists of at least two hydrants, whereby the total number of hydrants is determined so that the distance between the two hydrants cannot exceed 50m. A cabinet with two 50m hoses, equipped with nozzles, must be installed next to each hydrant.



- The total number of mobile fire extinguishers according to the manufacturer's instructions, the filling capacity of 9kg of powder or other suitable means depends on the surface to be protected and they must be placed so that the distance between the two mobile devices does not exceed 10m.
- During transferring, there must be at least one other mobile fire extinguishing device with a filling capacity of at least 50 kg of powder or other appropriate means of destruction next to the transport tank.
- The installation of the pipeline route must be envisaged in accordance with the Rulebook on the conditions for uninterrupted and safe distribution of natural gas by gas pipelines with a pressure of up to 16 bar ("Official Gazette" of the Republic of Serbia No. 86/2015)
- When selecting the route, designing and constructing the gas pipeline, safe and reliable operation of the distribution gas pipeline must be ensured, as well as the protection of people and property, i.e. the possibility of harmful environmental impacts on the gas pipeline and the gas pipeline on the environment must be prevented.
- Within the complex, the route of the overhead gas pipeline is planned, which will be led by pipe bridges from the entrance to the consumer.
- In accordance with Article 7 on conditions for uninterrupted and safe distribution of natural gas by gas pipelines with a pressure of up to 16 bar ("Official Gazette" of the Republic of Serbia No. 86/2015), it is necessary to ensure adequate distances of the gas pipeline from other installations. The minimum horizontal permissible distances of overhead gas pipelines to overhead power lines and telecommunication lines are:

Installation	Minimum distances (m)	
Overhead power lines	$1 \text{ kV} \geq U$	Post height + 3 m*
$1 \text{ kV} < U \leq 110 \text{ kV}$	Post height + 3 m	
$110 \text{ kV} < U \leq 220 \text{ kV}$	Post height + 3.75 m	
$400 \text{ kV} < U$	Post height + 5 m	
Telecommunication lines	2.5	

\* but not less than 10 m. This distance can be reduced to 2.5 m for lines with self-supporting cable harness.

- In accordance with Article 8, the minimum height of installation of overhead gas pipelines from the elevation of the terrain are:

	Minimum height (m)	Achieved
In the passages of the people	2.2	$\geq 2.2$
In places where there is no transport and no passage of people	0.5	$\geq 0.5$

- In accordance with Article 9, it is necessary to provide for vertical light distances between overhead gas pipelines and other pipelines:
  - at the nominal diameter of the gas pipeline up to DN300 - not less than the diameter of the gas pipeline, but at least 150 mm;
  - at the nominal diameter of the DN300 gas pipeline and higher - minimum 300 mm
- Intersection of the overhead gas pipeline with overhead power lines is allowed only if these are constructed as self-supporting cable harnesses.
- When intersecting overhead gas pipelines with overhead power lines, the power lines must pass above the gas pipeline, with a protective network placed above the gas pipeline, and the gas pipeline must be grounded.

- The minimum horizontal distances of the outer edge of overhead gas pipelines from other facilities or facilities parallel to the gas pipeline shall be in accordance with Article 10, as follows:

<b>Buildings and structures in the industrial complex</b>	<b>Distance Required (m)</b>	<b>Achieved distance (m)</b>
From gas pipelines to sources of danger of plants and facilities for the storage of flammable and combustible liquids and flammable gases	15	>15
From gas pipelines to other industrial facilities classified in the first and second fire hazard categories in accordance with a special regulation	10	>10
Roads within the factory or company	1	>1
Pipeline pillar foundation to underground installations	1	>1
Substation in the building	5	12.9

- In the complex in question, the only facility in which a larger number of people is expected is the Operational Centre, which is 16.3 m away from the control station, which is more than the required 5m according to Article 11 in the Regulations:

<b>Facility</b>	<b>Distance Required (m)</b>	<b>Achieved distance (m)</b>
Railway	10	> 10
Pavement of city roads	3	>3
Local road	3	>3
State road, except highway	8	> 8%
The highway	15	>15
Internal roads	3	4.8
Source of danger of the petrol station for road transport, smaller vessels	10	None
Hazard source of plants and facilities for the storage of flammable and combustible liquids and flammable gases	10	13.1
Transformer station	10	15.3
Overhead power lines		
1 kV $\geq$ U		Post height + 3 m*
1 kV $<$ U $\leq$ 110 kV		Post height + 3 m*
110 kV $<$ U $\leq$ 220 kV		Post height + 3.75 m
400 kV $<$ U		Post height + 5 m

- In the event of a power outage, a backup power source, a diesel electric generator (DEA) with complete equipment necessary for automatic operation, is provided for the supply of certain consumers in the facilities. For the power supply of all general electrical consumers, from a backup power source, the main distribution cabinet GROA-OP is planned, which will be located in the electrical room with a low-voltage plant.
- It is envisaged that safety systems operating in case of fire are powered through DEA and diesel pumps with their own tank. Diesel pumps are provided in the pumping station of the fire extinguishing system.
- In accordance with the Regulations on Technical Norms for Fire Protection of Industrial Facilities ("Official Gazette of the RS", No. 1/2018 and 81/2023) on the facilities, the areas needed to compensate for fresh air are also provided, which must be of the same surface area as the smoke and heat extraction openings.



- Smoke extraction of the facility W-C11 – Waste thermal treatment plant is carried out using 10 roof domes, each measuring 2,100 x 1,800 mm. The total area to smoke is >3% of the building area. Air compensation is via external rain protection blinds explained within the ventilation of the facility.
- It is necessary to provide openings for the supply of fresh air of at least the same surface in the lower half of the height of the facade.
- The total area of smoke and heat extraction openings in the facility U-C02 – Maintenance building and auxiliary systems facility is ~ 45m<sup>2</sup>. It is necessary to provide openings for the supply of fresh air of at least the same surface in the lower half of the height of the facade.
- In the facility W-C08, where, due to the type of raw material to be stored, a large smoke is expected in the event of a fire, the design envisages a system for natural smoke and heat removal through roof domes that will be opened on fire alarm. Therefore, the smoke extraction of the facility was solved using roof domes in the zone of the waste unloading room and service reception of the rake with 2% of the surface area and for the higher part of the facility with 3% of the base area. Replacement of air is carried out through the front door (roll door) of the waste unloading rooms and service reception of the rake and pretreatment of non-hazardous and hazardous waste
- Natural smoke and heat extraction switchboards should be connected via addressable modules to the fire alarm centre for the purpose of exchanging information, as well as activating executive functions from the smoke extraction switchboards. Manual activation of the smoke extraction switchboards is done through manual detectors of orange colour.
- Addressable modules must be installed on a special fire alarm loop that will be equipped with a fire function.
- An air conditioning chamber on the roof of the building W-C01 Reception guardhouse and administrative building are planned to ventilate the space and prevent the penetration of outside air into the rooms (all rooms are under mild overpressure).
- A PP flap is provided on the wall of the laboratory room, where the duct enters the room. In addition to the FP flap, a regulating blind is also provided, which is guided by the pressure difference in front and behind the room in order to prevent the penetration of contaminated air into the rest of the facility. Laboratories have their own local digesters.
- The laboratory sample warehouse has a local suction fan to maintain underpressure and minimal ventilation.
- Ventilation of transformer boxes is foreseen by forced ventilation in the facility W-C02 Operations Centre. Fan operation control is performed based on the thermostat in each room.
- The ventilation of the diesel generator is carried out using a fan integrated into the diesel generator (as part of the diesel generator project). The ventilation ducts are used to directly drain the exhaust air from the diesel generator cooler. There are rain blinds on the facade. The air supply is on the opposite side of the building, and the blinds are located in the front door of the diesel generator room.
- Ventilation of the MCC room is carried out by means of suction fans, which are located in the frequency regulator zone. The air supply is from the outer facade, and in the zone of the double floor. In order to seal the room in case of fire, a sealing flap with an electric drive with a quick response was installed before each rain blind. During the fire alarm, and before the activation of the fire extinguishing gas, all flaps are closed and the fans are extinguished. A pressure relief damper was also installed to reduce the pressure during fire extinguishing activation (the dimensions of the damper should be defined in the fire extinguishing design). After a successful shutdown, flaps open and ventilation is activated.
- The DCS room is ventilated using an aspiration fan. The ignition and extinguishing is done on the basis of a timer. The air supply is from the outer facade, on the opposite side in relation to the suction fan. In order to seal the room in case of fire, a sealing flap with an electric drive with a quick response was installed before each rain blind. During the fire alarm, and before the activation of the fire extinguishing gas, all flaps are closed and the fans are extinguished. A pressure relief damper was also installed to reduce the pressure during fire extinguishing





activation (the dimensions of the damper should be defined in the fire extinguishing design). After a successful shutdown, flaps open and ventilation is activated.

- In the zone of the garage in the facility W-C04 Pumping station and fire station, an axial wall fan is provided, which is guided on the basis of the CO concentration in the space (on/off mode). Air compensation is a door roller at the entrance to the garage.
- Mechanical ventilation in the facility W-C08 Pretreatment and waste storage is provided for the following rooms:
  - Space for sludge storage and dosing equipment – with existing suction ventilation for the needs of the boiler 2,000 m<sup>3</sup>/h. Air compensation is from the facade of the building
  - Oily and bilge water tank room – Axial wall fan for suction from a space with a floating blind with a capacity of 4,500 m<sup>3</sup>/h. The air compensation is from the external roller shutter door from this room, as well as the waste unloading room and the service reception of the rake and the pretreatment of non-hazardous and hazardous waste
  - Pretreatment of hazardous waste – axial wall fan for suction from a space with a floating blind with a capacity of 3,500 m<sup>3</sup>/h. Air compensation is from the facade of the building
  - IBC warehouse and barrels – axial wall fans (3 pieces) for suction from spaces with floating blinds with a total capacity of 17,000 m<sup>3</sup>/h. Replacement of air is from the facade of the building – 4 rain blinds
  - Room for tanks of combustible and non-combustible liquid – 2 channels are provided with associated elements for inserting and sucking air from the space
  - Total amount of insertion/extraction is 2.500 m<sup>3</sup>/h
  - The open part of the facility to the roof is ventilated by suction of 33,000 m<sup>3</sup>/h using the system required for the operation of the boiler in W-C11. Air compensation is on the ground floor from the facade of the building using 2 ducts and 2 rain blinds.
- Therefore, the smoke extraction of the facility was solved using roof domes in the zone of the waste unloading room and service reception of the rake with 2% of the surface area and for the higher part of the facility with 3% of the base area. Replacement of air is carried out through the front door (roll door) of the waste unloading rooms and service reception of the rake and pretreatment of non-hazardous and hazardous waste
- In addition to the planned fans for the ventilation of the facility for the needs of the boiler plant, an additional 35,000 m<sup>3</sup>/h is extracted from the space – constantly in operation (this part is not the subject of the thermomechanical design). So, the maximum ventilation that can be achieved is 335,000 m<sup>3</sup>/h. Replacement of air is carried out through external rain blinds located in the lower zone of the building on the west facade. The dimension of one of the 29 grids is 2,000 x 1,155 mm, i.e. the effective area per grid is 1.0974m<sup>2</sup>, i.e. the total effective area of all grids is 31.8246m<sup>2</sup>.
- The W-C11 facility is smoked using 10 roof domes, each measuring 2,100 x 1,800 mm. The total area to smoke is >3% of the building area. Air compensation is via external rain protection blinds explained within the ventilation of the facility.
- On the southwest facade of the building W-C12 Stabilization and solidification, 3 fans are provided in EX protection, which is switched on if the main ventilation system of the building W-C12 is stopped. The planned fans have a total capacity of 15,000 m<sup>3</sup>/h, designed to avoid an increase in hydrogen concentration in any part of the facility. Replacement of air is carried out through 10 external rain blinds, each measuring 400 x 1,155 mm.
- The lightning protection installation of each facility consists of internal and external lightning protection installations (UGI and SGI) that are galvanically interconnected and form an effective protection against atmospheric discharges.
- For the protection of buildings from direct lightning strikes, a classic lightning protection installation is planned, formed in the form of a "Faraday cage".
- Visually inspect lightning protection installations at least once a year. Recommended periods of complete control and testing of the lightning protection installation depending on the level of protection, according to SRPS EN 62305-3:2011 are: every two years for the I level of protection; every four years if the II level of protection and every six years if the III or IV level of protection;



- The earthing conductor is intended as a foundation earthing conductor. The grounding is performed by placing a galvanized steel strip FeZn 25x4mm in the foundation of the facility.
- Grounding of metal masses in facilities: cable racks, electrical and TCS cabinet housings, hydrant network pipes, hydrants, machine channels, equipment stands, machine equipment, other metal structures, is carried out with the N2XH-J 1x16mm<sup>2</sup> conductor, which is laid from the equipotential bonding boxes or from the PE bus of the cabinet, along the cable routes, and the connection is made through cable lugs and screws with a gear washer.

In order to prevent and protect against explosions, it is necessary to ensure the application of organizational and technical measures for safe work in accordance with the nature of work and according to priorities, starting from the following principles:

- prevention of the occurrence of explosive atmospheres except when the nature of the work carried out so requires;
- avoidance of ignition of explosive atmospheres;
- mitigating the adverse effects of the explosion.

If necessary, these measures will be combined and/or supplemented with other measures whose application should prevent the spread of the explosion and revise them periodically, as well as in the event of significant changes that may affect the safety of employees. In places where there is a risk of potential explosions, the applied protection measures have achieved that this risk is very small.

It is the obligation of the Project Holder to:

- train employees for safe work;
- inform employees about all types of risks that may occur due to explosive atmospheres.
- to act according to the prepared Study on Hazardous Zones,
- ensure that work in the hazardous area is carried out in accordance with the instructions in writing,
- issues permit to work in high-risk workplaces, as well as in other workplaces where the performance of work may lead to risks due to explosive atmospheres and
- the work permit is issued by the responsible person, prior to the commencement of work

The primary protection measure is provided through design technical and technological solutions of equipment, installations and process parameters, as well as by placing the facility at an appropriate distance from other facilities. Secondary protection measures are provided by working regulations and the following solutions:

- U Grounding of pipelines, metal structures, equipment and construction locksmiths;
- Appropriate local ventilation of the equipment;
- Adequate general ventilation of the premises;
- The design ventilation system must meet the requirements of the Regulations on technical standards for ventilation or air conditioning systems (Official Gazette of the SR No. 38/89).
- Before starting work, the correctness and cleanliness of the device is checked;
- It is forbidden to use sparking tools;
- It is forbidden to introduce open flames into the Plant and
- Workers in the facility are required to wear appropriate clothing.

In order to ensure adequate preventive fire protection during the work process, the following should be undertaken:

- Strict adherence to the prescribed technological production process.
- The design ventilation system must meet the requirements of the Regulations on technical standards for ventilation or air conditioning systems (Official Gazette of the SRJ br.38/89).
- Regularly check the functionality of all electrical devices and fire-fighting equipment.
- Inform visitors and staff about the behaviour at the plant in order to prevent fire outbreaks.



- It is important to detect the fire at the beginning and not allow its duration. All fire protection systems are based on its early detection and timely intervention with mobile and stable fire extinguishing equipment.
- Electrical devices are placed in zones of as low a degree of danger as possible or in a non-hazardous space if the technological and technical conditions of operation of the plant allow.
- If electrical appliances and installations are placed in areas endangered by explosive mixtures of flammable gases, vapours or mists, then they must meet the requirements for the area endangered by these mixtures.
- New electroenergetic installations and electrical installations to be reconstructed containing devices and installations that may cause the ignition of an explosive atmosphere must be supplied with the following information:
  - documentation on the basis of which the classification of the hazardous area was carried out (based on SRPS IEC 60079 – 10) with plans showing the classification and scope of hazardous areas including zoning
  - optional assessment of the consequences of ignition,
  - assembly and connection instructions,
  - documentation – data on conditions of use,
  - a document describing the system for the self-insurance system,
  - statement of the manufacturer / qualified person - applies in case the code is non-standard (except in case of a simple assembly in self-safety version or energy limited circuits),
  - necessary information to ensure the correct placement of the equipment to suit the personnel handling it,
  - information necessary for the inspection, for example the cleaning period,
  - information on the repair (replacement) carried out, whether the repair was carried out by the user or service technician,
  - temperature class or ignition temperature of the gas or vapor present,
  - external influence and ambient temperature.
- The basic principle of anti-explosive protection is to prevent the formation of a potentially explosive atmosphere, and when this is not feasible, to prevent the contact of the explosive atmosphere with ignition agents.
- For areas where there is a risk of explosion, the Rulebook on equipment and protective systems intended for use in potentially explosive atmospheres („Official Gazette of the Republic of Serbia”, nos. 10/17 and 21/2020) and the Regulation on preventive measures for safe and healthy work due to the risk of explosive atmospheres („Official Gazette of the Republic of Serbia”, nos. 101/12 and 12/13) shall apply.
- In order to prevent and protect against explosions, the Project Promoter is obliged to ensure the implementation of technical and/or organizational measures for safe and healthy work in accordance with the nature of the work performed, according to priorities, starting from the following principles:
  1. prevention of the occurrence of explosive atmospheres except when the nature of the work carried out so requires;
  2. avoidance of ignition of explosive atmospheres;
  3. mitigating the harmful effects of the explosion in order to ensure the safety and health at work of employees.
- Measures for safe and healthy work should, if necessary, be combined and/or supplemented with other measures whose application should prevent the spread of the explosion and should be revised periodically, as well as in the event of significant changes that may affect the safety and health of employees.

- The Project Holder is obliged, in accordance with the basic principles of risk assessment, starting from the principles of prevention, to ensure the application of preventive measures in order to ensure the safety and health at work of employees so that:
  1. Where explosive atmospheres may occur in quantities that may endanger the safety and health of employees or other persons, ensure working environment conditions in which work can be carried out in a safe manner;
  2. In a work environment where explosive atmospheres may occur in quantities that may endanger the safety and health of employees, use appropriate technical means, and in accordance with the risk assessment, ensure appropriate monitoring of the situation at all times while the employees are present.
- Safety labels, for areas where explosive atmospheres may occur, based on the Regulation on Preventive Measures for the Safety of Workers at Risk of Explosive Atmospheres ("Official Gazette of the Republic of Serbia ", br. 101/2012 i 12/2013 ) Exposed signs of a hazardous and healthy environment where explosive atmospheres may occur: shape – triangle; black pictogram on a yellow background; bordered in black; yellow occupies at least 50% of the surface of the mark.



#### SPACE WITH THE POSSIBILITY OF EXPLOSIVE ATMOSPHERE OCCURRENCE

Hazardous areas must not contain substances and devices that can cause a fire or allow it to spread.

- In danger zones it is not allowed to:
  1. Holding and use of tools, devices, equipment and installations that are not intended for operation in danger zones, and may be the cause of fire, or explosion;
  2. Smoking and using open fire in any form;
  3. Disposal of flammable and other substances not intended for the technological process;
  4. Access to vehicles that can produce sparking during the operation of their drive device;
  5. Wearing clothing and footwear that may lead to the accumulation of static electricity and the use of devices and equipment that are not properly protected against static electricity.
- In danger zones, signs must be placed in visible places warning of the obligation and reading:
  - "NO SMOKING AND ACCESS TO OPEN FLAMES",
  - " ACCESS DENIED TO THE UNEMPLOYED",
  - "RISK OF FIRE AND EXPLOSION"
  - "MANDATORY USE OF NON-SPARKING TOOLS", etc.
- When performing works in danger zones, the user of the plant must take the prescribed safety measures.
- The execution of electroenergetic, non-electroenergetic installations and protective systems in danger zones shall be carried out in accordance with the regulations and standards governing fire and explosion safety in areas endangered by explosive atmospheres.
- Vehicles with an internal combustion engine may be used in areas endangered by explosive atmospheres only if they are equipped with protective devices on the engine exhaust systems.
- Provide employees with protective equipment and control the wearing of protective equipment.
- issues permit to work in high-risk workplaces, as well as in other workplaces where the performance of work may lead to risks due to explosive atmospheres and
- It is the obligation of the project holder and the equipment supplier that the installed equipment in the danger zones must have an appropriate domestic document of conformity of the Designated Conformity Assessment Body, as well as to comply with the applicable Serbian standards,



according to the Decree on the manner of conducting conformity assessment and the Decree on the manner of recognition of foreign documents and signs of conformity („Official Gazette of the Republic of Serbia”, no. 98/2009);

- The management of all technological processes will be carried out through the DCS system through which the monitoring of all process parameters will be carried out, as well as the envisaged building management system (BMS) through which video surveillance, operation of ventilation systems (air conditioning) will be monitored.
- Liquid waste storage tanks will be located in reinforced concrete tanks of sufficient volume to receive the leaked liquid from one of the tanks (including the leak of the largest tank). All tanks are closed type and will be located within the facility for pretreatment and storage of waste
- Each tank will be equipped with the necessary instrument equipment, control valves, ON/off valves, pressure, temperature gauges, level gauges with remote indication on the DCS, high level switch as overfill protection, which upon reaching the high level stops the pump for receiving from the car loading station.
- Nitrogen connections are provided on the dosing container, which enters the container if there is an increase in temperature in this device (nitrogen as an inert gas prevents the appearance of flames).
- K When the boiler plant does not work, nitrogen is automatically introduced into the sludge receiving hopper in order to inert the space.
- After inserting the waste into the chamber of the hazardous waste shredder, the door of the chamber closes automatically and at that moment nitrogen (N<sub>2</sub>) is introduced into the chamber of the stove, thus inert the atmosphere in the chamber and preventing the emission of pollutants outside the shredder. Complete mechanical treatment equipment will be located in a closed facility intended for pretreatment and storage of waste.
- A double-walled reservoir to be housed in a concrete waterproof tank is provided for the storage of ammonia water (25% solution). During the summer months when the outside temperature is above 75 degrees Fahrenheit [25°C], it is necessary to cool the ammonia water storage tank. The reservoir is cooled by water from the water pool for recycling. There are 2 pumps (working and spare) for the tank armament.
- U In the W-C12 and W-C08 facility in the event of an explosion, in the bag filter, the inlet pipeline is provided for the installation of a mechanical PEK flap, which prevents the explosion from spreading to another part of the system. To protect the other side, the filter outlet, a chemical barrier is provided on the filter outlet channel, which prevents the penetration of the explosion to other equipment. On the bag filter itself there will be a service door and an anti-explosive panel (the destructive foils), which prevents an increase in pressure in the device in the event of an explosion, they are split, and the explosive flow is directed upwards by means of a repellent, thus preventing the endangerment of both people who are in the immediate vicinity, and other equipment;
- Maintenance and repair will be carried out according to a clearly defined dynamic, all in accordance with the applicable standards and regulations in this field and the instructions of the manufacturer/supplier of the equipment.
- Maintain green areas in good order. The grass must be mowed regularly and kept green by regular watering.
- Regularly keep streets clean and passable.
- All safety precautions are observed when maintaining premises and equipment.

### **8.2.2 Measures to respond to the accident and eliminate the consequences of the accident**

- Accident response measures will be defined by the Safety Report and the Accident Protection Plan, to which the consent of the competent Ministry of Environmental Protection will be obtained within the legally prescribed period;





- In the event of a leak or spill of hydraulic and insulating oil, or small quantities of diesel, secure the spill site, pour the spilled quantity with a sufficient amount of absorbent, collect the contaminated absorbent and store it in appropriate containers until it is handed over to an authorized operator;
- If there has been a leakage of diesel outside the area where the diesel generator is located and environmental pollution that requires remediation or remediation of the area by specialized companies, inform the ministry responsible for environmental protection as soon as possible;
- Water from fire extinguishing within the waste warehouse will be collected in collection pools and transferred to one of the tanks by means of a pump from where it will be dosed to the boiler plant for thermal treatment.
- Within the facility W-C08 Pretreatment and waste storage, two basins are planned for the collection of wastewaters from fire extinguishing:
  - o T.4 Fire extinguishing water basin 1 – designed to collect fire extinguishing water in waste bunkers
  - o T.5 Fire extinguishing water basin 2– is designed to collect fire extinguishing water in the premises where the waste and water pretreatment equipment is located from the drainage of the pipeline from the fire extinguishing system valve station.
- Pumps for emptying the water pool from fire extinguishing will be located in room T.3 Pumping station for water from fire extinguishing.
- If a fire occurs in the area where the waste is pre-treated, the contaminated water resulting from extinguishing, collect and drain the collection channels into the designed pool marked T.5 Fire extinguishing water pool 2.
- If there is a fire in the waste bunkers, take the contaminated water/foam resulting from the fire extinguishing, through the grate openings provided at the bottom of the bunker, to the collection pool T.4 Fire extinguishing water pool 1.
- Bearing in mind that these are wastewater that may be loaded with various pollutants whose treatment is not possible within the wastewater treatment plant in question, these waters should be pumped to the pumping station for water from fire extinguishing, pumped to the liquid waste storage from where they will be dosed to the boiler plant for thermal treatment.
- Due to possible complex activities during evacuation and extinguishing, upon arrival of the fire brigade on site, an operational headquarters should be formed, whose task is to connect and organize all tactical actions (rescue of endangered persons, fire extinguishing, uninterrupted water supply, delivery of necessary equipment, etc.);
- In the event of an accident at the facility in question, the project holder is obliged to immediately inform the ministry responsible for environmental protection, the local self-government unit (city) and the authorities responsible for handling emergency situations, in accordance with the regulations governing the said activity, about the circumstances related to the accident, the presence of hazardous substances, the available data for assessing the consequences of the accident on people and the environment and the emergency measures taken;
- In order to ensure timely and adequate response and make immediate decisions, which contributes to reducing the consequences or preventing the development of an emergency situation, define the method of notification of emergency events.
- It is the obligation of the project holder to develop a post-accident monitoring program after possible accident situations, which will contain planned activities for monitoring the state of the environment in terms of pollution by substances from the group of hazardous substances involved in the accident.



### **8.3 Environmental protection plans and technical solutions (recycling, treatment and disposal of waste materials, reclamation, remediation, etc.)**

During the preparation of planning, project and technical documentation, certain legal acts in the field of environmental protection were also applied.

According to the Zoning Plan of the Municipality of Negotin („Official Gazette of the Municipality of Negotin“, No. 16/2011), the area in question is defined as an industrial zone or industrial-port centre of significant development potential.

The development of the chemical industry complex in Prahovo, which consists of "Elixir Prahovo - Chemical Products Industry LLC Prahovo" and "Phosphea Danube" LLC (hereinafter referred to as the Industrial Complex) is defined by the Second Amendments and Supplements to the Detailed Regulation Plan for the Chemical Industry Complex in Prahovo („Official Gazette of the Municipality of Negotin“, No. 17/2022), and by building an industrial park, a chemical park, an energy island, an ecological island, expanding the phosphorus gypsum warehouse, as well as providing a green buffer zone and displacing the routes of local roads outside the industrial complex, thereby ensuring the isolation of the impact of the industrial complex and the production process. The existing Industrial Complex occupies an area of about 148 ha, and there is a planned expansion in the east-west direction, so that the planned Industrial Complex occupies about 594.41 ha.

#### ***8.3.1 Environmental protection plans and technical solutions during the execution of works on the construction of the Waste-to-Energy Plant and Landfill for non-hazardous waste***

- Before starting the execution of works, the Project Holder is obliged to obtain the appropriate technical documentation (PGD, PZI and the Main Fire Protection Design, etc.), provide its control and collect the necessary approvals in accordance with the Law on Planning and Construction ("Official Gazette of the RS", No. 72/2009, 81/2009 - correction, 64/2010 - CC decision, 24/2011, 121/2012, 42/2013 - CC decision, 50/2013 - CC decision, 98/2013 - CC decision, 132/2014, 145/2014, 83/2018, 31/2019, 37/2019 - other law, 9/2020 and 52/2021 and 62/2023).
- Perform the works according to the technical documentation on the basis of which the Decision on the execution of works of the Ministry of Construction, Transport and Infrastructure was issued, i.e. according to the technical measures, regulations, norms and standards applicable to the construction of this type of facilities
- It is the obligation of the Project Holder to appoint an expert to supervise the execution of works, who will be the link between the contractor and the designer.
- Prior to the commencement of works on the installation, the Contractor is obliged to thoroughly study the design and clarify any ambiguities with the supervisory authority or the designer.
- The Contractor is obliged to prepare a study on the arrangement of the construction site, which, together with the report on the commencement of works, shall be submitted to the competent labor inspection.
- The Contractor is obliged to keep a construction log in which, in addition to the records of the performed works, he will record all changes, additional and subsequent works during that day. After the daily inspection, the Supervisory Authority shall certify the Contractor's statements with its signature.
- Only certified welders should be allowed to perform works on pipeline installations (SRPS – EN 287–1–2)
- Reinforcement works should be prepared in the workshop, and only installed on the facility
- Protect steel structures, supports and pipelines in contact with air, water and soil from corrosion with an appropriate protection system
- Spatially restrict the execution of construction and other works without removal or with the smallest possible removal of the cover protective layer due to the needs of site preparation and the construction of facilities, i.e. only with the necessary minimum penetration through the



cover protective layer issued exclusively for the needs of (deep) foundation of piles in the aquifer environment;

- When clearing the terrain in the works area, all regulations on the protection and safety of work must be observed and any harmful impact on the environment and the immediate environment of the site must be prevented
- When performing earthworks, use data on the exact position of existing infrastructure facilities (underground electroenergetic cables, pipelines, etc.) in order to avoid damage to them.
- If, during the construction of the planned facilities, the presence of pollutants in the soil and groundwater, hazardous to their quality, is determined, it is mandatory to plan and carry out remediation and remediation of the soil/soil, in accordance with the Law on Environmental Protection ("Official Gazette of the RS", No. 135/2004, 36/2009, 36/2009 - other law, 72/2009 - other law, 43/2011 - decision of the Constitutional Court, 14/2016, 76/2018, 95/2018 - other law and 95/2018 - other law), the Law on Land Protection ("Official Gazette of the RS", No. 112/2015), Regulation on systematic monitoring of the state and quality of soil ("Official Gazette of the RS", no. 88/2020), the Rulebook on the content of remediation and reclamation projects ("Official Gazette of the RS", No. 35/2019) and other regulations in this field;
- Backfilling of the terrain (up to the planned elevation) and/or soil replacement should be carried out in accordance with the recommendations of previous and planned engineering-geological surveys, exclusively with material that does not endanger the quality of soil and groundwater.
- During construction, use materials that meet the prescribed standards or that are provided with a certificate issued by a professional organization registered for the activities of testing that material
- Use existing roads and roads as access to the construction site.
- The construction material, where the dusted shredded material is located, should be covered with foil/tarpaulin or sprinkled with sprayed water in order to reduce the possibility of raising dust due to wind.
- Organizational measures to prevent the scattering of construction materials during transport by covering the truck.
- In the event of high-speed wind and "critical" directions, the works should be temporarily suspended.
- In order to reduce emissions of pollutants into the air originating from machinery, do not leave running engines on vehicles and machinery when not in use.
- Work should be carried out in day mode. Observe the regulations related to the maximum permissible noise level in the environment.
- In the event of interruption of works for any reason, it is necessary to provide the facility and the environment.
- Work tools and accessories must always be clean and neatly stacked.
- After the completion of the works, repair the environment of the construction site in accordance with the design and according to the following:
  - all temporary traffic signalization, installed for the functioning of the construction site and traffic regulation, is completely removed after the completion of works and the original traffic regime is restored;
  - after the completion of works and individual phases of works, completely clean the construction site from all waste construction materials, temporary scaffolding, obstacles and protective fences and remaining construction tools, equipment and machines.
- If archaeological sites or archaeological objects are encountered during the execution of earthworks, the contractor is obliged to immediately, without delay, stop the works, take measures to prevent the finding from being destroyed and damaged, and to preserve it in the place and position in which it was discovered (Article 109 Of the Law on Cultural Property) and the competent institute for the protection of cultural monuments.
- The project holder is obliged to provide funds for research, protection, preservation, publication and display of goods that enjoy prior protection that is discovered during the construction of



the investment facility - until the goods are handed over to an authorized protection institution (Art. Article 110 of the Law on Cultural Property).

### **8.3.2 Environmental protection plans and technical solutions during the regular operation of the Waste-to-Energy Plant**

Thermal treatment of non-recyclable hazardous and non-hazardous waste must be carried out in accordance with the Regulation on technical and technological conditions for the design, construction, equipment and operation of facilities and types of waste for thermal treatment of waste, emission limit values and their monitoring ("Official Gazette of the RS", no. 103/2023), and to that end, the Project Holder within Waste-to-Energy Plant will obtain the following:

- Waste thermal treatment shall provide and ensure conditions to prevent or limit negative impacts on the environment, in particular pollution by air, soil, surface and groundwater emissions, as well as possible risks to human health from waste thermal treatment, while meeting the technical conditions in accordance with the established emission limit values for incineration, or other conditions provided for in the project-technical documentation of waste management, in accordance with the permit, law and regulation.
- Measuring equipment will be installed, using a method for monitoring parameters, working conditions and mass concentrations that are important for the incineration process.
- Monitoring will be carried out by measuring under the conditions and in the manner determined by the permit.
- The installation and correct operation of automatic equipment for monitoring emissions into air and water are subject to annual control measurements in accordance with the certificate.
- Measuring devices used to measure emissions will be controlled and calibrated and tested in accordance with the regulation governing the emission of pollutants into the air (Regulation on the Measurement of Emissions of Pollutants into the Air from Stationary Pollution Sources "Official Gazette of the RS", no. 5 /2016) in relation to the half-hour mean value at least once a year, and their calibration and testing are performed by laboratories accredited for calibration and testing, in accordance with the prescribed standard.
- Calibration and testing of measuring devices used to measure emissions will be performed through parallel measurements with reference methods at least every third year, that is, it will be repeated after each significant change (repair or modification of the gauge).
- The certificate of calibration and the report on the results of calibration and testing of the correctness of the device are prescribed to be submitted to the relevant authority for the authorization of professional measurement organizations within 60 days.
- The technical and technological conditions for the operation of the waste thermal treatment plant have been implemented and installed in the project technical documentation and will be carried out at the location in Prahovo so:
  - that the plant is designed and equipped, capable of operation and maintenance, so that it meets the requirements prescribed by the Regulation on technical and technological conditions for the design, construction, equipment and operation of facilities and types of waste for thermal treatment of waste, emission limit values and their monitoring and the Law on Waste Management, bearing in mind in particular the categories of waste to be incinerated;
  - that emissions of pollutants and energy into the air and water do not exceed the limit values for emissions of pollutants into the air from the incineration plant and the limit values for emissions of pollutants when discharging wastewater from the waste gas cleaning system of the incineration plant, prescribed in the annexes to the regulation, as well as the limit values prescribed by the relevant conclusions on the best available techniques;
  - that the construction and other technical requirements have been met, in accordance with a special regulation;
  - that during the waste thermal treatment, the obtained heat was used and used for the production of electricity, cogeneration production of thermal energy and electricity,



**production of process steam for the needs of other industrial plants within the industrial complex (for the needs of production facilities within the Elixir Prahovo complex);**

- that the conditions for reducing the quantities of waste incineration residues, their hazardous characteristics and their reuse are met, which is achieved by using the best available technologies;
  - that residues of waste after waste thermal treatment are minimized, that these residues are reused, if technically feasible and economically justified;
  - that incineration residues, the formation of which cannot be prevented, reduced or which are disposed of if they cannot be reused, in accordance with the regulation and regulations governing the incineration of waste;
  - that accident protection measures are envisaged;
  - that monitoring of operation is planned, which includes a program for monitoring emissions of pollutants into the air, soil and water.
- It is envisaged that the waste incineration plant will be managed by a qualified person who is responsible for professional work.

#### **8.3.2.1 Measurement, reception and unloading of waste**

- At the location for the operation of the waste thermal treatment plant in Prahovo by the incineration, it is provided a sufficient space for the reception, inspection and sampling of the received waste, i.e. the manipulative space where the undisturbed internal traffic of transport vehicles, loading and unloading of waste is carried out.
- Access to the Waste-to-Energy Plant will be done through internal roads that have been formed within the existing industrial chemical complex Elixir Prahovo. Vehicles with waste materials can enter only through the gate of the Elixir Prahovo complex where the ramp and the guardhouse are located, and then after the first check and identification of the vehicle, the vehicle moves along the internal road to the Waste-to-Energy Plant itself, where the vehicle enters exclusively through the gate located on the southeast side of the complex.
- In order to control the entry/exit from the subject Waste-to-Energy Plant at the entrance, the facility W-C01 Reception guardhouse and administrative building are planned, where the inspection, verification, measurement, reception and examination of the delivered waste will be carried out.
- At the entrance to the thermal waste treatment plant, the installed scale will measure the mass of the waste transport vehicle and measure the waste received in the plant, i.e. complete control and registration of the reception.
- The waste thermal treatment plant is equipped with devices for washing vehicles before and after unloading waste into the plant, and the exit of clean vehicles outside the boundaries of the complex is ensured.
- Based on the characteristics of the thermal treatment plant, identification of types of waste that can be thermally treated (in terms of e.g. physical condition, chemical characteristics, hazardous properties and acceptable ranges of calorific value, humidity, ash content, etc.), as well as in accordance with the provisions of the Rulebook on waste categories, examination and classification ("Official Gazette of the RS", No. 56/2010, 93/2019 and 39/2021) and the Regulation on technical and technological conditions for the design, construction, equipping and operation of plants and types of waste for waste thermal treatment, emission limit values and their monitoring ("Official Gazette of the RS", no. 103/2023) **clearly defines the list of waste that may/may not be received and treated in the plant in question and which is attached to the study.**
- **It is strictly forbidden** to receive waste to the plant, that is explosive, flammable, infectious, radioactive, waste materials containing or contaminated with polychlorinated biphenyls (PCBs) and/or polybrominated triphenyls (PCTs) and/or polybrominated biphenyls (PBB), waste containing cyanides, isocyanates, thiocyanates, asbestos, peroxides, biocides, cytostatics, with the following characteristics:





HP 1	"Explosive": waste in which, due to chemical reactions, gas can be generated at such temperatures, pressures and rates that it can cause destruction in the environment. This includes self-igniting waste, explosive organic peroxide waste and explosive self-reactive waste.
HP 3	"Flammable": waste which, according to its properties, is easily ignited or which, due to friction, can ignite or contribute to the creation of a fire: - flammable liquid waste: liquid waste whose ignition point is below 60°C or waste gas oil, diesel and light fuel oil whose ignition point is in the temperature interval between $> 55\text{ °C}$ and $\leq 75\text{ °C}$ ; - self-igniting liquid and solid waste: solid or liquid waste that, even in small quantities, can ignite within five minutes after coming into contact with air; - flammable solid waste: solid waste that is easily flammable or can cause or promote fire by friction; - flammable gaseous waste: gaseous waste that can ignite after coming into contact with air at a temperature of $20\text{ °C}$ and a standard pressure of 101.3 kPa; - waste that reacts with water: waste that in contact with water releases flammable gases in dangerous quantities; - other flammable waste: flammable aerosols, flammable self-heating waste, flammable organic peroxides and flammable self-reactive waste.
HP 9	"Infectious": waste containing active microorganisms or their toxins, which are known or suspected to cause disease in man or other living organisms
HP 12	Release of acute toxic gases: waste that releases toxic or highly toxic gases in contact with water or acid (classified as acute toxic, cat. 1, 2 or 3)

- The project documentation defines the range of waste calorific value (finished fuel) from 7 MJ/kg to 20 MJ/kg that can be treated at the boiler, as well as humidity, ash content and ash particle size.
- The project documentation defines that waste containing more than 1% of halogen organic substances expressed as chlorine **cannot be treated** in the boiler.
- **Additional restrictions on reception** to the plant in question are waste substances in the form of aerosols, as well as organometallic compounds (spent metal-based catalysts, or organometallic wood preservatives) and aluminized paints.
- It is forbidden to receive waste sludge containing illicit hazardous substances whose reception and treatment is prohibited at the plant in question, in accordance with the following: radioactive sludge, sludge containing or contaminated with polychlorinated biphenyls (PCBs) and/or polybrominated triphenyls (PCTs) and/or polybrominated biphenyls (PBBs), sludge containing cyanides, isocyanates, thiocyanates, asbestos, peroxides, biocides, as well as sludge classified as explosive, highly flammable and flammable, infectious and sludge releasing toxic or highly toxic gases in contact with water, air or acid. It will not be allowed to receive substances that exceed the limit values of the amount of POPs substances according to Article 4 and Annex I part A, Regulation (EU) 2019/1021 of the European Parliament and the Council of June 20, 2019.
- It is the obligation of the Project Holder that when the vehicle with the waste material arrives at the location in question, the recipient of the waste, at the entrance to the complex, before receiving the waste, performs a radioactivity test of the delivered waste. If the meter detects elevated radioactivity, immediately inform the relevant republic inspection and the ministry, bearing in mind that it is strictly forbidden to receive radioactive waste at the warehouse in question, and give the driver an order to park the vehicle until the inspection arrives.
- It is the obligation of the Project Holder to regularly implement the procedures of pre-acceptance and acceptance of waste in accordance with the conclusions on the best available



techniques<sup>3</sup> BAT9(c) and BAT11, as well as in accordance with the Regulation on technical and technological conditions for the design, construction, equipping and operation of plants and types of waste for waste thermal treatment, emission limit values and their monitoring. These procedures define the elements that are checked and verified when accepting the waste into the plant, as well as the criteria for accepting or not accepting waste.

- Acceptance of waste that can be reused, composted or recycled is prohibited.
- Before receiving **non-hazardous waste**, the waste recipient will carry out the following verification procedures:
  - 1) documentation following the waste (Documents on the movement of waste, delivery notes, weighing sheet, etc.);
  - 2) Waste Examination Report prepared in accordance with the list of parameters for waste examination for the needs of thermal treatment in accordance with Annex 9 of the Rulebook on Waste Categories, Examination and Classification ("Official Gazette of the RS", nos. 56/2010, 93/2019 and 39/2021);
  - 3) hazardous characteristics of waste, the substances with which it should not be mixed and precautions to be taken when handling waste;
- When receiving the waste, the recipient is obliged to check:
  - 1) all data on the waste generation process contained in the documents monitoring the movement of waste;
  - 2) the label, name, description of the waste and its physical and chemical properties and all necessary information required for the sampling and characterization of the waste before the thermal treatment;
  - 3) a description of the hazardous characteristics of the waste, the substances with which the waste cannot be mixed and the precautions to be taken by the operator when handling the waste in the thermal treatment process.
- Prior to the reception of **hazardous waste** in the facility in question, the waste recipient is obliged to carry out a reception procedure identical to that for the reception of non-hazardous waste, and in particular to carry out:
  - 1) checking the documentation following hazardous waste (Documents on the movement of hazardous waste, delivery notes, weighing sheet, etc.), and, if necessary, the documentation defined by the regulations governing the transport of hazardous goods (in accordance with the Law on the Transport of Dangerous Goods, etc.)
  - 2) taking representative samples of waste before unloading, in order to check compliance with the data from the accompanying documentation and the Report on Waste Testing prepared in accordance with Annex 9 of the Rulebook on Waste Categories, Examination and Classification ("Official Gazette of the RS", nos. 56/2010, 93/2019 and 39/2021);
  - 3) measures enabling the relevant authority to inspect and identify waste subject to thermal treatment.
- •In order to check the compliance of the delivery with the accompanying documentation (waste characterization report, preliminary pre-acceptance test report (in accordance with BATC 9 of BATC WI – Commission implementing decision EU 2019/2010 of 12 November 2019 establishing the best available techniques (BAT) conclusions, under Directive 2010/75/EU of the European Parliaments and the Council for waste incineration (notified under documents C(2019) 7987, etc.)), quick analyzes (about 60 min.) are planned (in accordance with BATC 9 and BATC 11 of BATC WI – Commission implementing decision EU 2019/2010 of 12 November 2019 establishing the best available techniques (BAT) conclusions, under Directive 2010/75/EU of the European Parliaments and the Council for waste incineration (notified under documents C(2019) 7987), if necessary, before the actual reception at the site. To check the

<sup>3</sup> Commission implementing decision (EU) 2019/2010 of 12 November 2019 establishing the best available techniques (BAT) conclusions, under Directive 2010/75/EU of the European Parliament and of the Council, for waste incineration (notified under document C(2019) 7987)



physical and chemical properties of the delivered waste, referral for treatment, representative samples will be taken, and the representative samples will be analyzed and tested as part of the internal central laboratory protocol. During quick analyses, test the following parameters: determination of sensual properties, determination of calorific value of waste, ash content, moisture content, concentration of total halides. Rapid analyzes will be performed in the internal laboratory at the very entrance to the complex. In the case of deviation of the parameters from the expected values determined in the pre-acceptance procedure, the truck will not be allowed to unload until a complete analysis and determination of all parameters that were the subject of the waste pre-acceptance procedure. If it is determined that the waste does not correspond to the contract through the analytical procedure, the acceptance will be refused. Additional waste tests may include ignition temperature, halogen content, sulfur (S) content, heavy metal content, viscosity, density, POPs content, etc. (in accordance with BATC 9 and BATC 11 of BATC WI – Commission implementing decision EU 2019/2010 of 12 November 2019 establishing the best available techniques (BAT) conclusions, under Directive 2010/75/EU of the European Parliaments and the Council for waste incineration (notified under documents C(2019) 7987)).

- In order to check the physical and chemical properties of the delivered waste, before unloading the waste at the designated place and further referral to pretreatment and then thermal treatment, take representative samples and perform analysis and testing of representative samples as needed within the internal central laboratory, by examining the following parameters: sensory properties, ignition temperature, calorific value (MJ/kg), water or moisture content, ash content, total halogen content expressed as chlorine (Cl), sulfur content (S), polychlorinated biphenyls (PCB) content, heavy metal content: arsenic (As), antimony (Sb), copper (Cu), beryllium (Be), vanadium (V), mercury (Hg), cadmium (Cd), tin (Sn), cobalt (Co), nickel (Ni), lead (Pb), thallium (Ta), chromium (Cr) and zinc (Zn). If necessary, additional detailed analyses will be performed, such as the content of halogen substances individually (Cl, F, Br, I), cyanide content, viscosity, density, mechanical impurities, content of macro-elements ( $\text{SiO}_2$ ,  $\text{Al}_2\text{O}_3$ ,  $\text{Fe}_2\text{O}_3$ ,  $\text{CaO}$ ,  $\text{MgO}$ ,  $\text{TiO}_2$ ,  $\text{Mn}_2\text{O}_3$ ,  $\text{K}_2\text{O}$ ) and more.
- During the performance of rapid analyses, until the results of examination and confirmation of compliance with the data from the accompanying documentation are obtained, the transport vehicle with waste material must be temporarily parked in the foreseen area, Truck Parking, which is located directly next to the facility W-C01 Reception guardhouse and administrative building, and outside the fence of the Waste-to-Energy plant itself.
- Representative samples may only be taken by trained and equipped employees of the operator in accordance with regulations and standards in this field. The representative sample of waste represents a sample taken from the total amount of waste that has the same characteristics as the average waste composition and that is subject to chemical analysis.
- In addition to the central laboratory on the first floor of the facility, a warehouse for storing laboratory samples, the documentation archive room and the laboratory office are also planned.
- Wastewater generated from washing dishes and equipment in the laboratory should be collected and piped into a buried polypropylene tank ( $V=5 \text{ m}^3$ ), and then pumped into IBC containers and transported by a forklift for unloading to liquid waste storage tanks and then treated at the boiler plant in question.
- Within the central laboratory, 4 digesters are planned to prevent the spread of unpleasant odours when performing experiments and examinations of waste, wastewater, etc. Each digester is equipped with a ventilation system with an air purification filter and a roof outlet.
- All analyses may only be performed by professional staff of the appropriate profession (engineers, chemists, laboratory technicians, sampling technicians, etc.).
- Waste that does not meet the requirements for admission to the facility in question must not be accepted and it must be returned to the supplier without delay by the same means of transport.
- In order to determine the amount of waste received at the facility in question the measurement at the entrance to the waste thermal treatment plant on the intended freight scale (W-C10) is



performed.

- After reception control and measurement, refer the vehicle to the truck wheel washer (U-C03 Wheel Washing Unit). It is envisaged to install a package unit that is based on a modular concept and is distinguished by a robust construction, as well as a large cleaning capacity. The wheels of the vehicles which has delivered the waste to the site of the plant must also be washed after unloading the waste, and before leaving the site in question.
- The water from the washing of the wheels of the trucks which has delivered the waste material is drained into the collection shaft located within the package wheel washer unit. The wastewater is then pumped into a tank where solids are deposited by passing water through the overflow chamber. The purified water is then reused by the pump to wash the wheels and therefore no outflow of water into the recipient is foreseen.
- Water reception tanks should be periodically cleaned of saturated water and precipitated substances, and the contents of the cleaning should be temporarily stored in the W-C08 facility until treatment at the plant in question.
- When taking over non-hazardous waste, the Project Holder is obliged to fill in and certify a copy of the Document on the movement of waste, in accordance with the Rulebook on the form of the document on the movement of waste and the instructions for its completion ("Official Gazette of the RS" no. 114/13) and keep them for at least two years;
- In case of receiving hazardous waste, the shipper of hazardous waste is obliged to submit to the ministry responsible for environmental affairs and the Environmental Protection Agency, at least 48 hours before the start of movement, a prior notification with data on waste in electronic form, by entering the data into the information system of the National Register of Pollution Sources, in accordance with the Rulebook on the form of the Document on the movement of hazardous waste, the form of prior notification, the manner of its delivery and instructions for their completion. ("Official Gazette of the RS", No. 17/17) and the law governing the protection of personal data.

Upon receipt of hazardous waste at the location of the plant in question, it is the obligation of the Project Holder to submit to the Environmental Protection Agency, in electronic form, no later than 15 days from the end of the movement of waste, by entering the data into the information system of the National Register of Pollution Sources, the Form of the Document on the Movement of Hazardous Waste with the final, supplemented data on waste, in accordance with the law governing the protection of personal data. The recipient of hazardous waste shall also submit a fully certified and signed Waste Movement Document to the postal address of the Ministry and the Agency, in accordance with the law governing waste management.

- It is the obligation of the Project Holder to record and adequately dispose of the non-hazardous and hazardous waste in question immediately upon receipt at the location of the waste management plant in accordance with special regulations, i.e. it must keep records of the received quantities of non-hazardous and hazardous waste.
- It is the obligation of the Project Holder to keep daily reports on waste, and to submit the report on annual quantities of waste to the Environmental Protection Agency on the basis of the Rulebook on the daily records form and the annual report on waste with instructions for its completion ("Official Gazette of the RS", nos. 7/2020 and 79/2021); Reports must be kept in the company archives for the next five years.
- All documentation foreseen by the relevant law provisions, as well as documentation produced by the procedures of pre-acceptance and acceptance of waste at reception will be combined with the measured mass at reception and stored under a unique code in the database of accepted waste, uniquely generated. The documentation will be stored in the electronic database of accepted waste for treatment.
- The operational instruction for receiving and preparing waste for treatment prescribes checking the compatibility of hazardous waste characteristics in accordance with the compatibility matrices available in the European Commission, Integrated Pollution Prevention and Control Reference Document on Best Available Techniques on Emissions from Storage, July 2006. In the absence of available information, a laboratory mixing test is carried out in the plant's



internal laboratory. In both cases, the decision on the mixing and the conditions under which it is done is made by an expert person with a high degree in chemical field.

- In order to automate and optimize the fuel mixing process in the bunkers, cranes have been designed for waste transfer and will be operated by operators from the Operations Centre facility.
- Different types of solid waste, depending on their characteristics, should be stored in, designed for this purpose, reinforced concrete, waterproof bunkers for the separation of compatible and incompatible types of waste.
- After the vehicle with waste material enters the unloading facility, the front door must be automatically closed. The unloading points in the receiving bunker itself will also be equipped with industrial segment doors, which open only when the truck is ready to unload waste into one of the aforementioned reception bunkers. The industrial segments of the doors are equipped with an electric drive with an automatic door stop when encountering an obstacle and the possibility of manual opening in the event of a power failure. When the unloading of the waste is completed, the bunker door is closed, the truck can then leave the facility, after which the main door at the entrance to the facility is closed again, which prevents the emission of unpleasant odours outside the facility.
- When operating the cranes, the external door of the facility cannot be opened (there is a blockage).
- In order to ensure the reception of a wide range of different types of liquid waste, all pipelines will be made of stainless steel with electric trace heating.
- It is the responsibility of the Project Holder to keep the place for storing the waste in question clean and tidy.
- Waste handling can only be carried out by trained and professional persons.
- It is mandatory to turn off the engine of transport vehicles when they are stationary, ie when unloading waste;

#### 8.3.2.2 Waste thermal treatment and production of thermal energy in the form of steam

- The thermal waste treatment plant is fully automated, which enables control of incineration efficiency, monitoring of parameters and prevention/reduction of emissions.
- The thermal waste treatment plant is based on a fluidized bed boiler plant (BFB) with precise incineration control.
- The waste incineration plant will be equipped with at least one auxiliary burner which must be activated automatically when the process gas temperature drops below 850°C. The burner must be activated automatically when the process gas temperature drops below 850°C.
- In the waste incineration plant, the prescribed temperatures are measured near the inner wall of the incineration chamber.
- The auxiliary burner is not powered by fuel that can cause higher emissions than those resulting from the combustion of fuel oil, liquid or natural gas (For the operation of the burner on the plant in question, natural gas is used as auxiliary and ignition fuel).
- The incineration plant has and uses an automatic system to prevent the addition of waste:
  - 1) at the start-up of the plant, until the temperature reaches the level of 850 °C;
  - 2) when the temperature is not maintained at 850 °C;
  - 3) when it is determined by continuous measurement carried out in accordance with the Regulation that the limit values have been exceeded due to some malfunction or interruption of the operation of the waste gas cleaning plant.
- The project envisages a boiler plant with optimization of waste flow and composition, temperature, flow of primary and secondary combustion air in order to efficiently oxidize organic compounds while reducing the formation of NOx.
- The construction of the boiler is such as to allow a residence time of 2 seconds and a temperature of 850-950°C.





- The waste incineration plant operates in such a way as to achieve a combustion completion level that guarantees that the total level of organic carbon (TOC) in the slag and boiler (fireplace) ash will be less than 3% in accordance with Article 8 of the Regulation on technical and technological conditions for the design, construction, equipment and operation of plants and types of waste for thermal waste treatment, emission limit values and their monitoring ("Official Gazette of RS", number 103/2023), as a binding requirement for technological the solution.
- In accordance with BATC 20 WI (of BATC WI – Commission implementing decision EU 2019/2010 of 12 November 2019 establishing the best available techniques (BAT) conclusions, under Directive 2010/75/EU of the European Parliaments and the Council for waste incineration (notified under documents C(2019) 7987), the minimum requirement for boiler efficiency when treating hazardous waste is 60-80%. and 60-70% for sludge from wastewater treatment. Since the mentioned installation has the possibility of using all mentioned types of waste, a minimum efficiency of 0.7 expressed in decimal notation was adopted. In operational work, a significantly higher energy utilization than the above is expected, expressed according to the methodology described in the Rulebook on categories, testing and classification of waste ("Official Gazette of RS", no. 56/2010, 93/2019, 39/2021 and 65/2024).
- In the event of a malfunction of the thermal waste treatment plant, it is the obligation of the Project Holder to reduce or completely cease the activity as soon as possible until the normal operation is established.
- It is conditioned by the project that the Waste-to-Energy Plant may in no case continue to operate for more than four hours without interruption if the emission limit values are exceeded, whereby the cumulative period of operation in such conditions must not exceed 60 hours during one year. The 60-hour period also applies to those lines in the plant that are connected to a single combustion gas treatment device.
- Carbon monoxide (CO) and total organic carbon (TOC) emission limits cannot be exceeded.
- It is the obligation of Project Holder to report to the relevant ministry the **Annual report, which refers to operation and monitoring of the waste incineration plant**. The report contains data on the incineration process and on emissions into air and water compared to the emission limit values set out in the Regulation on technical and technological conditions for the design, construction, equipping and operation of plants and types of waste for waste thermal treatment, emission limit values and their monitoring ("Official Gazette of the RS", no. 103/2023).
- Annual monitoring reports on the complex in question will be submitted to the relevant authority in accordance with the Regulations of the methodology for the development of the national and local register of pollution sources, as well as the methodology for the types, methods and deadlines for data collection ("Official Gazette of the RS", nos. 91/2010, 10/2013, 98/2016 and 72/2023).

### 8.3.2.3 Procedures for solid residues from the boiler plant

- The incineration process is designed in such a way that the amount of residues from the boiler plant is minimized and that the environmental and human health impacts are minimized.
- The residues will be treated on-site or off-site, whenever possible, in accordance with the regulation governing waste management.
- For waste incineration plants, the change in operating conditions must not cause higher residues or residues with a higher content of organic pollutants compared to those residues that can be expected in accordance with the conditions referred to in Article 12. Regulation on technical and technological conditions for the design, construction, equipping and operation of plants and types of waste for waste thermal treatment, emission limit values and their monitoring ("Official Gazette of the RS", no. 103/2023).
- The ash suspension from the reactor and the ash suspension storage, together with the gypsum suspension from SO<sub>2</sub> Scrubber is delivered to the centrifuges (where the separation



of the solid and liquid phases is performed) and ends up in the equipment for the transport of incineration residues in the boiler plant (slag and ash).

- It is envisaged that before determining the manner of disposal or recovery operations of the residue from the incineration plant, appropriate examinations will be carried out to determine the physical and chemical properties and potential pollution from various residues from the incineration process, in accordance with the Rulebook on Waste Categories, Examination and Classification ("Official Gazette of the RS", nos. 56/2010, 93/2019 and 39/2021); The examinations shall cover in particular the total soluble fractions and the heavy metals in the soluble fraction.
- In order to manage all waste streams generated by the operation of the subject fluidized bed boiler plant (slag, boiler ash, cyclone ash, economizer ash, filter ash, activated carbon with a fraction of fine particles from flue gas and sludge/thickened sediment from wastewater treatment) and to dispose them in accordance with the Law on Waste Management and related by-laws, all streams are collected in a controlled manner by the designed boiler conveyor system and taken to the stabilization and solidification plant (W-C12).
- In order to harmonize the characteristics of the solid residues from the boiler plant and bring them to a state suitable for disposal at the subject Landfill for non-hazardous waste in accordance with the criteria defined by the Rulebook on Waste Categories, Examination and Classification ("Official Gazette of the RS", nos. 56/2010, 93/2019 and 39/2021), the Regulation on disposal of waste on landfills ("Official Gazette of the RS", no. 92/2010), i.e. with the EU Landfill Directive (Directive (EU) 2018/850 of the European Parliament and of the Council of 30 May 2018 amending Directive 1999/31/EC on the landfill of waste), the first step in the solid residue treatment process is the **removal of metals from coarse ash ("bottom ash")** using magnetic separation and separation induced by a magnet (eddy current). The second step is the process of stabilization (when reactions take place in which controlled hydrogen release occurs, chromium (Cr(VI)) reduction reaction, etc.) and **solidification** by adding cement, water and, if necessary, additives in accordance with previously performed waste analyses. The aim of the treatment is to process solid residues from the boiler plant, curing and obtaining material that is formed at the landfill into a material with high mechanical strength, low permeability and encapsulated pollutants, i.e. low leaching rate.
- It is the obligation of the Project Holder to regularly, before the very beginning of the solidification process, examine the physical and chemical characteristics of previously stabilized residues from the boiler plant, in accordance with the Rulebook on Waste Categories, Examination and Classification ("Official Gazette of the RS", nos. 56/2010, 93/2019 and 39/2021), Appendix 8 List of parameters for determining the physico-chemical properties of hazardous waste intended for physico-chemical treatment.
- Analyses of physical and chemical properties should be performed on a representative sample taken, within the laboratory provided for in the plant. Based on the test results, the recipes and material balances for the solidification process will be defined.
- The obtained solidificate, a product of physical and chemical treatment, will be examined and classified in accordance with the Rulebook on Waste Categories, Examination and Classification ("Official Gazette of the RS", nos. 56/2010, 93/2019 and 39/2021): Disposal of non-reactive hazardous waste at landfills for non-hazardous waste. If these results meet the conditions prescribed for the disposal of non-reactive hazardous waste at landfills for non-hazardous waste, the solidified material will be disposed of at the Landfill for non-hazardous waste. On the other hand, if this is not the case, the solidificates will be sent to the authorized operator of landfills and/or hazardous waste storage.
- Waste examining must be carried out through professional organizations and other legal entities authorized for sampling and characterization according to the scope of examination for which they are accredited, in accordance with special regulations. Waste characterization is performed for hazardous waste and for waste that, according to its origin, composition and characteristics, may be hazardous waste. Waste examination reports must be kept in the archives of the company for at least five years.



- In order to reduce the retention time of solid residues from the boiler plant in the stabilization and solidification facility, the project envisages a mixer for solidification of appropriate capacity, and for the purpose of disposal of solidificates that has the characteristics of non-reactive hazardous waste, the Landfill for non-hazardous waste is designed next to the plant.

#### 8.3.2.4 Air protection measures

- The incineration plant is designed, and will be equipped, built and operated so that after the last injection of air into the incineration process, the process gases reach a temperature of at least 850 °C for two seconds of duration in a controlled and homogeneous manner, even under the most unfavourable conditions.
- Ventilation of the space in which IBC containers /barrels/jumbo bags are located, as well as the space of the transfer station from IBC containers/barrels, is provided through axial wall fans for suction from the space with floating blinds. The air compensation is from the facade of the building over 4 rain blinds.
- The air from the sludge compartment should be taken to the boiler plant using a combustion air fan, in order to keep the storage under pressure and prevent the spread of unpleasant odours outside the facility. Air compensation is from the facade of the building. When the boiler plant does not work, nitrogen is automatically introduced into the sludge reception bunker in order to inertize the space.
- In order to reduce air emissions from storage tanks, the tanks are equipped with:
  - o nitrogen maintains a constant overpressure of 0.3 barG in tanks, which ensures that there are no unpleasant odours or vapours of stored liquids in the room.
  - o exhaust gas drainage system via automatic valves on the outlet pipelines from the gas tank space. When reaching a pressure of 0.4 barG in the tank, the valve is opened and the gas is discharged, which is taken by pipeline to the intake of the combustion air fan in the boiler installation, and then to the thermal treatment. As the vessels are maintained under nitrogen overpressure, the composition of the exhaust gas is predominantly nitrogen.
  - o If for any reason these systems fail, the tanks are equipped with safety and relief valve that allows pressure relief, i.e. prevents the occurrence of vacuum.
- Ventilation of the space in which the storage tanks (of combustible and easily volatile liquids) are located is provided through 2 channels with associated elements for inserting and exhausting air from the space.
- Ventilation of the space in which the storage tanks for oily and bilge water are located is foreseen through the suction ducts by which the air is taken to the intake of the combustion air fan in the boiler plant, and then to the thermal treatment. In case of downtime of the boiler plant, an axial wall fan is provided for ventilation of this space for suction from the space with a floating blind. The compensation of air is from the external roller doors from this room, as well as the rooms for unloading waste and service reception of the rake and pretreatment of non-hazardous and hazardous waste.
- When transferring liquid waste from tank trucks to the gas phase arm, a pressure balancing line is connected, which represents the connection with the gas space of the tank to which the transfer is carried out in case that the discharge is carried out into one of the tanks under overpressure of nitrogen, in order to prevent the evaporation of easily volatile liquids when discharging.
- When transferring waste, the engine of the transport vehicle must be switched off, and the tank truck must be properly grounded.
- The project envisages a flue gas cleaning plant from the boiler plant, and before discharge into the atmosphere, which includes:
  - o **dry flue gas cleaning system** (cyclone, bag filter system and activated carbon filter) in which the separation of first, larger particles of fly ash, and then the separation of dioxins and heavy metals by adsorption of said particles into the pores of activated carbon, and finally the removal of particulate matter.



- **wet flue gas cleaning system** (scrubber system - HCl Scrubber and SO<sub>2</sub> Scrubber). In the HCl scrubber, cooling of flue gases to saturation temperature in contact with water and absorption of halogen and SO<sub>3</sub> compounds takes place. The second (SO<sub>2</sub>) scrubber is used to remove sulfur oxide from the flue gases.
  - **NO<sub>x</sub> catalytic reduction system** (SCR system).
- The waste incineration plant is designed and equipped so that the limit values of emissions into the air from Appendix 2 LIMIT VALUES FOR EMISSIONS OF POLLUTANTS INTO the AIR of the aforementioned Regulation are not exceeded during operation, as well as the values prescribed by the conclusions on the best available techniques Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control Commission Implementing Decision (EU) 2019/2010 of 12 November 2019 establishing the best available techniques (BAT) conclusions, under Directive 2010/75/EU of the European Parliament and of the Council, for waste incineration.
- Waste gases from the waste incineration plant will be discharged in a controlled manner through a smokestack whose height has been calculated in such a way as to protect human health and the environment.
- It is envisaged that measurements of pollutants into the air from the incineration plant are carried out in accordance with Annexes 2, 3 and 6 of the Regulation on technical and technological conditions for the design, construction, equipping and operation of plants and types of waste for waste thermal treatment, emission limit values and their monitoring ("Official Gazette of the RS", no. 103/2023), in accordance with the monitoring prescribed in Chapter 9 of this Study and the Integrated Permit.
- Measurement will be performed by standardized methods in accordance with the conditions of measurement referred to in Article 15 of the Regulation, the method of calculation referred to in Article 17 of the Regulation and Annex 5. FORMULA for calculating the EMISSION CONCENTRATION UNDER NORMAL OXYGEN CONCENTRATION PERCENTAGE CONDITIONS.
- Measurement points will be determined in accordance with the regulation governing the emission of pollutants into the air (Regulation on the measurement of emissions of pollutants into the air from stationary sources of pollution "Official Gazette of RS", no. 5/2016 and 10/2024)
- All emitters must have provided measuring points for measuring the emission of pollutants into the air in accordance with the standard SRPS ISO 9096:E. Determination of the location and equipment of representative measuring points for emission measurement is performed by an authorized legal entity in accordance with the requirements and recommendations of the SRPS EN 15259 standard. The measuring point is established so that it is large enough, easily accessible and equipped so that the measurement can be performed in the prescribed manner and without danger for the person performing the measurement, as well as that the measurements performed are representative of the emissions from the stationary source of pollution in question and in relation to the metrological conditions. In general, it is necessary to ensure that there are no disturbances on the emitter in front of and behind the measuring opening (curves, flaps, openings, etc.), in a length of 5 hydraulic diameters of the emitter in order to ensure the conditions for isokinetic sampling of powdery substances.
- The project holder is obliged to, in accordance with Article 15 and 16 of the Regulation on measurements of pollutant emissions into the air from stationary sources of pollution ("Official Gazette of RS", no. 5/16 and 10/24), prepare an emission measurement plan for all stationary emitters it owns. The emission measurement plan is drawn up in cooperation with the authorized legal entity for emission measurement. If, over time, there are changes to the stationary source (reconstruction, change of fuel, raw materials, etc.) or a change in regulations, it is necessary to amend the existing measurement plan. The content of the emission measurement plan is given in Section A of Annex 4 - Emission measurement plan and report on the measurement of pollutant emissions into the air, of the Regulation.



- Dedusting of the solid residue storage from the boiler plant and its solidification equipment should be carried out through a bag filter system where particulate matter was separated.
- The cement silo, mixer, cement weighing scale and solid residue weighing scale are equipped with a filter that prevents the emission of powdered substances into the atmosphere. Measurement of differential pressure with a high value alarm is provided on the aforementioned filters. If there is an increase in differential pressure, the alarm and the self-shaking system are activated (the filter self-shaking system is part of the filters themselves).
- The project holder is obliged to perform a guarantee emission measurement during the trial run of the stationary source of pollution in the process of obtaining a use permit in accordance with the regulations governing planning and construction. The warranty measurement is carried out for the purpose of comparing the measured values of emissions of polluting substances with the limit values of emissions. Warranty measurement is performed under operating conditions at the highest load of the stationary source of pollution.

### 8.3.2.5 Water and soil protection measures

- All waste material should be stored in a closed facility, with a waterproof concrete floor, under strictly controlled conditions, so that there is no possibility of water and land pollution and no possibility of access by unauthorized persons.
- The access road for the reception/dispatch of liquid waste materials in tank trucks is levelled in such a way that it has a drop towards the existing road and that it is raised from the existing terrain about 20 cm and from the second branch of the access road the water from the road flows towards the existing road. All service roads from this area will be connected to the rain sewer collector, and before entering the stormwater into the collector, they will be treated on the grease and oil separator;
- Within the transfer point, the installation of a line grate is planned, which will collect any leaked liquids during transfer and drain them to the collection pit. In this way, the possibility of leakage of the leaked fluid into the atmospheric sewerage and the surrounding soil is avoided.
- The contents of the collection pit will be pumped into IBC containers by the pump, which will be transported to the IBC container warehouse, and then treated at the Hazardous Waste Treatment Line (delivered in IBC containers, barrels, etc.).
- In the case of a small-scale spillage, appropriate absorbents for the collection of potentially leaked content (sawdust, sand, oil, alkali and acid absorbents) will be provided within the transfer station for the collection and dry cleaning of the leaked content. The contaminated sorbent will be disposed of in containers and subsequently treated at the plant in question.
- In addition to the transfer point (W-C13), it is also planned to install a shower for the purpose of rinsing hands and eyes in case of pouring on the operator when discharging liquid waste (in case of an accident). The water from the shower flows into the aforementioned manhole.
- IBC containers/barrels with waste material should be stored separately in the rack or non-rack part of the warehouse, according to the waste groups and their compatibility.
- All containers with hazardous substances where there is a possibility of damage and discharge of liquid or powdery hazardous substances must be stored in appropriate standard portable bundwalls.
- Liquid hazardous waste must be packed in packaging that is approved (UN code, <http://www.unpackaging.com/>) for the international transport of dangerous goods, and that meets the following criteria:
  - o strong enough to withstand shocks, loading, displacement from pallets or removal from over-pack packaging, suitable for manual or mechanical handling,
  - o made and closed in such a way as to prevent loss of contents during preparation for transport, transport, due to vibration or change in temperature, pressure, humidity,
  - o is closed according to the manufacturer's instructions so as to prevent the occurrence of waste outside the packaging.





- In all storage facilities, envisage corridors that will be used for handling, i.e. bringing waste by forklifts or trolleys for storage in designated and marked places.
  - It is the obligation of the Project Holder to periodically check the structural integrity of the vessels (mechanical cracks) and the occurrence of leaks. In case of need, certain measures will be taken such as replacing the packaging (container), rehabilitation of accidentally spilled contents, etc. In order to carry out the aforementioned control smoothly, access to the hazardous waste warehouse should be easy and free for easy repackaging, measurement, sampling, transport, etc.
  - A sufficient number of mobile bundwalls will be provided for the collection of any leaked contents, as well as appropriate absorbents for the collection and dry cleaning of the leaked contents (sawdust, sand, oil, alkali and acid absorbents).
  - Dispose the contaminated sorbent in intended containers for the collection of hazardous waste until further disposal and dispose it in a temporary storage facility for hazardous waste;
  - In the storage room of IBC containers and barrels, drainage grids are designed, which will carry all possibly leaked contents or water from washing to the collection pit. It is the obligation of the Project Holder to regularly maintain and empty the contents of the collection pit and to treat the contents of the pit at the boiler plant in question.
  - Different types of liquid waste should be stored in divided, separate tanks located in concrete waterproof bundwalls, depending on the characteristics of the waste (combustible, non-combustible, easily volatile, etc.).
  - In the bundwalls of the tanks, pumps are located, which will be used for transferring, possibly spilled liquid waste materials, from the bundwall to the appropriate tank.
  - Bundwalls are dimensioned in the manner defined by the Rulebook on Technical Norms for Fire and Explosion Safety of Plants and Facilities for Flammable and Combustible Liquids and on Storage and Transfer of Flammable and Combustible Liquids (Official Gazette of the RS nos.114/2017, 85/2021).
  - Each tank will be equipped with the necessary instrument equipment with a level meter with remote indication on the PLC, a high level switch as overfill protection, which upon reaching the high level stops the pump for receipt from the vehicle transfer point.
  - Store sludge waste in a separate watertight bunker intended for this purpose only.
  - Unload the sludge by tipping from the truck directly into the sludge reception bunker. After the unloading is completed, the transport vehicle leaves the facility, and the lid of the reception bunker closes.
  - The sludge reception and dosing system is automated to control and monitor the process from the reception of sludge to its dosing into the thermal treatment furnace.
  - In order to protect water and soil within the plant, a separate sewerage system is envisaged for:
    - o Atmospheric water from the roof of the facility;
    - o Oily atmospheric waters;
    - o Sanitary-foul wastewater,
    - o Technological wastewater,
    - o Wastewater from extinguishing possible fires.
- In all water treatment systems, devices are provided for measuring water flow, as well as measuring water quality at the inlet and outlet of the plant.
- Wastewater arising from wet flue gas cleaning should be treated at the wastewater treatment plant in the boiler plant consisting of:
    - o three-stage neutralization,
    - o the settling of heavy metals,
    - o flocculation,
    - o sedimentation and
    - o filtration.
  - Wastewaters from Waste-to-Energy Plant, created after the waste gas cleaning process, are discharged in accordance with the permit issued on the basis of special regulations, that is,



with the water conditions obtained in the process of obtaining the location conditions governing this area.

- Monitoring of the concentration of pollutants in wastewater is planned and will be carried out in the manner and within the deadlines determined in accordance with the Regulation on technical and technological conditions for the design, construction, equipping and operation of plants and types of waste for waste thermal treatment, emission limit values and their monitoring ("Official Gazette of the RS", No. 103/2023), regulations governing water quality management and the issued permit.
- The discharge of wastewater into the recipient is maximally limited to the extent possible, so that the emission limit values are in accordance with Appendix 4. LIMIT VALUES FOR POLLUTANT EMISSIONS IN WASTEWATER FROM THE WASTE GAS TREATMENT PROCESS GENERATED IN THE PLANT FOR INCINERATION AND CO-INCINERATION OF WASTE of the Regulation, as well as in accordance with the conclusions on the best available techniques Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control Commission Implementing Decision (EU) 2019/2010 of 12 November 2019 establishing the best available techniques (BAT) conclusions, under Directive 2010/75/EU of the European Parliament and of the Council, for waste incineration.
- Wastewater may be discharged into the recipient after special treatment, in accordance with the issued permit, if:
  - 1) the discharge is carried out within the prescribed emission limit values, in accordance with the regulation and other regulation;
  - 2) mass concentrations of pollutants do not exceed the emission limit values set out in Annex 4 of the Regulation.

Emission limit values are applied at the point where the wastewater generated in the waste gas treatment process containing pollutants referred to in Annexes 2 and 3 of the Regulation is discharged, in this case at the point of discharge of wastewater into the collector of all clean and treated waters of the Waste-to-Energy Plant.

- The Project Holder must perform appropriate material balance calculations to determine the emission levels in the final discharged wastewater that may in some way be associated with the water from the gas from incineration cleaning process, in order to verify compliance with the emission limit, values set out in Annex 4 of the Regulation for wastewater from the incineration gas treatment process.
- The project solved the wastewater treatment, i.e. wastewater cannot be diluted in order to achieve the emission limit values from Annex 4 of the Regulation on technical and technological conditions for the design, construction, equipment and operation of plants and types of waste for thermal treatment of waste, limit values of emissions and their monitoring ("Official Gazette of the RS", no. 103/2023).
- Within the subject complex, a wastewater reception pool with separate chambers is planned to provide sampling and checking of water quality before discharge to the recipient.
- In case that the quality of wastewater collected in the pool does not meet the criteria defined for the discharge of water into the recipient (Danube River), the project envisages returning the water back to the wastewater treatment boiler plant via a sand filter system and an activated carbon filter. In case that it is still not possible to purify the water to the required quality for discharge into the final recipient, the contaminated wastewater should be diverted to the liquid waste tank and from there to thermal treatment in the boiler.
- Before discharging into the clean water collector, sanitary-foul wastewater must be treated at the mechanical and biological treatment plant. Buried biological purifier with continuous recirculation of activated sludge with a capacity of 20 PE (40 employees) is planned. Purified wastewater should be discharged into the collector of conditionally clean rain sewage and then into the internal network of the Elixir Prahovo Industrial Complex, which ends with a discharge into the Danube River. Two bypass separators are planned for the efficiency of separating light petroleum products - light liquids in the separator outlet water up to 5mg/l.



- Potentially oily atmospheric water from all manipulative surfaces, roads and parking lots should be drained to the grease and oil separator for treatment before discharge into the recipient (with the collector of conditionally clean rainwater, purified water is conducted to the drainage Central collector for the entire Elixir Prahovo complex, and through it is discharged into the Danube).
- It is the obligation of the Project Holder to regularly clean and maintain the grease and oil separators and to treat the resulting sediment in accordance with the Law on Waste Management and by-laws in this field. An appropriate document shall be drawn up/completed on the amount and type of waste.
- It is the obligation of the Project Holder to regularly test the quality of wastewater on the grease and oil separator 4 times a year, through an authorized legal entity. The quality of wastewater must be in accordance with the Law on Waters ("Official Gazette of the RS", nos. 30/2010, 93/2012, 101/2016, 95/2018 and 95/2018 - other law), the Rulebook on the manner and conditions for measuring and testing the quality of wastewater and the content of the report on the performed measurements ("Official Gazette of the RS", no. 33/2016) and the Regulation on Emission Limit Values of Pollutant into Water and Deadlines for Their Reaching ("Official Gazette of the Republic of Serbia", nos. 67/11, 48/12 and 1/16).
- The dynamics of discharge and cleaning of the separator depends on the amount of sludge and petroleum products separated, i.e. on the method of operation and manipulation at the site itself (the interval must not exceed 6 months);
- The Waste-to-Energy plant, including the storage areas for waste within the plant area, is designed in such a way as to prevent illegal and unintentional leakage of pollutants into the soil, surface waters or groundwater, in accordance with the regulations.
- For diesel generators, which are planned to provide an alternative power supply solution, and their diesel fuel tanks, envisage a technical solution with the necessary protection in order to prevent pollution of surface and groundwater in the event of accidents.
- Wastewater generated by washing the process equipment used for solidification of residues from the boiler plant should be collected in the collection pit located in the facility W-C12 Stabilization and solidification. Return the collected water from washing the equipment to the solidification process. In this way, the consumption of process water is saved, and the required humidity of the material is also achieved, as well as the prevention of dust emission when manipulating residues from the boiler plant.
- Wastewater from fire extinguishing and other contaminated water that cannot be purified to the required quality for discharge into the final recipient (Danube River) must be thermally treated at the boiler plant in question.

#### 8.3.2.6 Noise protection measures

- All activities related to waste handling as well as equipment that can emit noise are located in closed facilities.
- Regularly monitor the condition of noise-emitting equipment through a regular maintenance plan. Additional verification of the integrity of the equipment should be carried out by establishing an inspection plan, as well as an equipment testing plan.
- Noise at the boundary of the complex must not exceed the limit value for the zone it borders, i.e.:
  - o For day and evening 60 dB(A) and
  - o For the night 50 dB(A).
- Facilities that are not part of an indivisible technological whole are separated, in order to minimize noise levels. The plant itself is not near other noise emitters.
- The obligation of the Project Holder is to perform noise measurement at the nearest residential buildings during the commissioning of the plant
- In case of exceeding the permissible noise level, the Project Holder is obliged to implement



additional measures in order to reduce and achieve the permissible noise level.

### **8.3.3 Environmental protection plans and technical solutions during regular operation of the Landfill for non-hazardous waste**

In accordance with the Regulation on the disposal of waste at landfills ("Official Gazette of the RS", no. 92/2010), a landfill of non-hazardous waste for the disposal of stabilized and solidified residues from the boiler plant at the location in Prahovo was designed:

- In order to meet the necessary conditions for preventing pollution of soil, underground and surface water, air and to ensure controlled management of leachate.
- The protection of soil, groundwater and surface water is achieved by the combination of the geological barrier and the bottom impermeable layer during the active phase of the landfill and the combination of the geological barrier and the upper impermeable layer during the passive phase after the landfill closure.
- During the design of the landfill, the technical and technological conditions for the construction of the landfill were complied with in accordance with Appendix 2. – Technical and technological conditions for the design, construction and commissioning of the landfill, relating to:
  - 1) landfill body;
  - 2) manipulative serving plateau;
  - 3) roads and necessary infrastructure;
  - 4) pools for collecting atmospheric and leachate wastewater;
  - 5) vegetation protection belt.
- The landfill operation procedure will be carried out in accordance with the technical and technological conditions provided for in the design and technical documentation, permit, law and regulation.
- Waste can be accepted at the landfill only if it meets the criteria for accepting waste at the Landfill for non-hazardous waste. The criteria for accepting or not accepting waste at the landfill are the limit values of the parameters for the disposal of solid, non-reactive hazardous waste (stabilized and solidified).
- Solid non-reactive hazardous waste is one whose leachate is equivalent to that for non-hazardous waste and which meets the limit values of the parameters for the disposal of non-reactive hazardous waste at landfills for non-hazardous waste in accordance with Annex 8, item 2. Disposal of non-reactive hazardous waste at landfills for non-hazardous waste in cassettes that are not used for disposal of biodegradable waste and Annex 10. List of parameters for waste testing for disposal, Rulebook on waste categories, examination and classification ("Official Gazette of the RS", nos. 56/2010, 93/2019 and 39/2021);
- Only pre-treated waste is disposed of at the landfill in accordance with the Law on Waste Management and other regulations.
- The acceptance of waste into a landfill is carried out according to a procedure that includes the following actions:
  - 1) disposal waste examination;
  - 2) compliance check;
  - 3) on-site check.
- Examination of waste for disposal shall be carried out for each type of waste, in accordance with a special regulation, and sampling in accordance with the prescribed standards. Data obtained by testing waste for disposal at a landfill, in particular must contain:
  - 1) a description of the previous waste treatment or a statement that the waste can be disposed of without prior treatment;
  - 2) composition of waste and leachate;
  - 3) the class of landfill to which the waste is disposed;
  - 4) proof that the waste is not waste from Article 9 of the Regulation on landfill disposal;
  - 5) special requirements and measures to be taken when disposing of, if necessary, in accordance with Article 13 of the Regulation on landfill disposal;
  - 6) certain key parameters for checking compliance, as well as its dynamics.



- For waste regularly produced in the same procedure and in the same plant, the examining in paragraph 1 of this Article produces data which particularly refer to:
  - 1) variability in the composition of individual types of waste;
  - 2) limits of variability of significant properties.
- Testing of waste intended for disposal should be carried out by hiring an authorized professional waste testing organization in accordance with the Law on Waste Management.
- The data obtained from waste testing are an integral part of the waste testing report for disposal submitted by the Project Holder to the competent authority.
- For waste regularly produced in the same process (S/S) in the plant in question, for which there is data specified in Article 16, paragraphs 2 and 3 of the Regulation on the disposal of waste at landfills, if the measurement results show small deviations from the limit values of the disposal parameters, testing should be performed at the first delivery, and then periodic compliance verification in accordance with the Regulation.
- The compliance check shall be performed periodically, at least once a year, in order to check the waste that is regularly delivered for disposal in order to determine whether the parameters of that waste correspond to the parameters obtained by testing the waste for disposal and whether they meet the limit values of the parameters for waste disposal. The compliance check should be performed only for those parameters that are determined as critical when testing waste for disposal.
- When checking compliance, the same tests that were used in testing waste for disposal will be applied.
- For waste whose characteristics are variable, waste to be disposed of shall be tested for each batch of waste and shall not be subject to compliance checks.
- It is the obligation of the project holder to regularly check the waste on site by visual inspection of each batch of waste before and after unloading, as well as checking the accompanying documentation in accordance with the Regulation on the disposal of waste at landfills. Waste is accepted at the landfill if it has been determined on the spot that it is identical to the waste for which the testing was performed, i.e. compliance check.
- The project holder must not accept waste at the Landfill for non-hazardous waste if it does not meet the requirements for disposal set out in the permit, when different types of waste are mixed, i.e. when the delivered waste poses a risk to human health and the environment and when the conditions for disposal prescribed by the Regulation on the disposal of waste at landfills and the Law on Waste Management are not met.
- It is the obligation of the project holder to prepare a location plan of the landfill during the disposal of waste (zoning of the disposal site of each batch of waste) with exactly indicated micro locations of cassettes in which solid non-reactive hazardous waste is disposed of and to keep it both during operation and after the closure of the landfill.
- In case that the waste does not correspond to the thermally treated recipe with a known composition of combustion residues, it is necessary to perform rapid analyses (surrogate) of waste leaching in the internal laboratory in order to determine the expected leaching of materials according to the ordinance established by the standard. According to the accredited method NEN 7345 Leaching Characteristics of Soil and Stony Building and Waste Materials, the compatibility of waste for disposal as non-reactive hazardous waste at a non-hazardous waste landfill in accordance with the Rulebook on categories, testing and classification of waste ("Official Gazette of RS", no. 56/2010, 93/2019, 39/2021 and 65/2024) will be determined after a leaching test from 64 days or less with the correction of the limit values in accordance with the mentioned rulebook. If the acceptance of waste that is determined to require supplementation or retesting of waste is refused, temporary storage of waste in the designated landfill area may be allowed for a period not exceeding four months. The authority responsible for issuing the permit shall be informed of the non-acceptance of waste at the landfill.
- In case of non-compliance with the with non-hazardous leaching criteria set for non-reactive waste class according to national (Regulation on disposal of waste on landfills ("Official Gazette of the RS", No. 92/2010) and EU regulation (Landfill Directive 1999/31/EC, Council





Decision 2003/33/EC for disposal to Non-hazardous waste landfill), the reactive hazardous waste will be removed from the landfill and directed to another authorized operator or recipient, transported using trucks according to hazardous waste transport regulations. The recipient will be an authorized operator of the hazardous waste landfill and/or underground mine operator permitted for acceptance and disposal of such waste streams.

- In accordance with Appendix 5 – Procedures and mode of operation of the landfill of the Regulation on the disposal of waste at landfills, it is the obligation of the Project Holder to comply with the procedures and mode of operation of the landfill when disposing of waste at the landfill, which refers to:
  - o **movement regime and operating procedures for all vehicles entering the landfill complex;**
    - (1) control and visual inspection of waste at the entrance;
    - (2) measurement of waste over the weighbridge;
    - (3) movement along service roads to the active section of the landfill;
    - (4) unloading of waste to the planned location – landfill segment;
    - (5) washing the wheels of the unloaded vehicle after unloading on the package washing unit;
    - (6) departure of the clean vehicle from the landfill;
    - (7) in the working zone of the landfill there are vehicles for spreading and compacting waste and they do not leave the landfill complex
  - o **rules applicable when disposing of waste;**
    - (1) waste disposal begins at the lowest level of the landfill;
    - (2) ensure that the daily, working area is kept as small as possible;
    - (3) each batch of waste brought in shall be immediately spread out and compacted;
    - (4) "layers" of waste are formed up to the projected height;
    - (5) provide the projected slopes of the work surface;
    - (6) provide and define individual segments on the landfill body for each batch of waste material accepted at the landfill;
    - (7) a layer of compacted waste is sprayed with water in order to reduce air pollution;
  - o **control of the formation and quality of leachate at the landfill;**
    - (1) control of the type and quantity of waste unloaded;
    - (2) control of the implementation of the designed technological process of landfill exploitation;
    - (3) control of maintenance of landfill bodies and roads;
    - (4) quality control of washing of transport vehicles;
    - (5) control of the quantity and quality of leachate;
    - (6) control of worker protection;
  - o **control of the formation and quality of leachate at the landfill;**
    - (1) temperature at the entrance to the designed facility and ambient air temperature;
    - (2) pH value of the leachate at the inlet and the purified liquid at the outlet of the designed facility;
    - (3) consumption of permanganate;
    - (4) BOD (biological oxygen demand);
  - o **control of particulate matter emissions from the landfill body.**
- At the very entrance to the landfill complex, there is a gate and a reception desk, so that, first of all, a check is carried out, a waste reception control is carried out and a sample is taken for the purpose of waste analysis.
- At the entrance to the landfill, place a sign made of durable material with permanent inscriptions, containing the name, the landfill operator's name, the landfill class, the address of the company disposing of the waste, operating hours, types of waste allowed for disposal, types of waste not allowed for disposal, and other significant information.
- After visual inspection of the condition of the waste and verification of the accompanying documentation, it is the obligation of the waste recipient, a qualified person responsible for



professional work at the landfill, to fill in part D of the Document on the movement of waste/hazardous waste in accordance with the Rulebook on the form of the document on the movement of waste and the instructions for its filling ("Official Gazette of the Republic of Serbia", no. 114/13) or the Rulebook on the form of the Document on the movement of hazardous waste, the form of prior notification, the manner of its delivery and the instructions for their completion ("Official Gazette of the RS", No. 17/17).

- When receiving each batch of waste, the authorized persons of the accredited laboratory will take a sample (the minimum amount of matter necessary for laboratory tests) of the solidificate, which is further analysed in accordance with the Rulebook on Waste Categories, Examination and Classification ("Official Gazette of the RS", nos. 56/2010, 93/2019 and 39/2021): Disposal of non-reactive hazardous waste at landfills for non-hazardous waste.
- Testing of the taken waste samples should also be carried out within the internal laboratory designed as part of the Waste-to-Energy Plant. Leaching tests for the monolithic waste in question (solidificate) will be performed according to the standard NEN 7345 Leaching Characteristics of Soil and Stony Building and Waste Materials – Leaching Tests – Determination of the Leaching of Inorganic Components from Building and Monolithic Waste Materials with the Diffusion Test. The values of the concentration limit value are given by the above Rulebook in relation to the 64-day test. For the purpose of obtaining preliminary rapid analyses for the test, use a shorter test, whereby the concentration limit values for individual parameters are adjusted to the duration of the test, in accordance with the aforementioned Rulebook.
- In order to protect against air pollution, i.e. to prevent the spreading of fine-grained material from the landfill, regular spraying of the landfill with water is planned.
- It is planned to establish on the landfill a completely closed system of water circulation from the landfill. Two separate water collection systems are envisaged:
  - o Leachate collection system by which water is transported to the wastewater pool provided in the space of the Waste-to-Energy Plant and
  - o The system for collecting atmospheric runoff from the landfill slopes to be collected and used for spraying water on the landfill slopes, thus achieving water recirculation.
- From the leachate pool, an emergency overflow to the stormwater pool is planned, in case of termination of the operation of the pump for transport to the wastewater pool in the area of the Waste-to-Energy Plant
- An emergency overflow is planned from the stormwater pool, which in the event of extreme precipitation will allow water to be evacuated into the peripheral canal of the phosphogypsum storage facility, which is located on the south side of the future Landfill for non-hazardous waste.
- In order to protect soil and groundwater, the bottom of the landfill body will be arranged as follows:
  - o the excavation of humus and other surface materials will be carried out in the area where future cassettes will be formed to a depth of 0.3-1.3 m, so that a uniform bottom elevation of 48 masl will be achieved,
  - o the cleaned area will be well rolled by multiple passage of rollers and compactors, which will ensure sufficient compaction that mimics the mineral barrier and at the same time prevent damage to the film during installation,
  - o a geomembrane made of high density polyethylene (HDPE) with a thickness of not less than 1.5 mm will be placed on the rolled surface, which meets the requirements of the Geosynthetic Research Institute (GRI) Test method GM 13 "Test Methods, Test Properties and Testing Frequency for High Density Polyethylene (HDPE) Smooth and Textured Geomembranes"<sup>3</sup> or the relevant European standards (EN 134934) and recommendations,
  - o a protective layer of geotextile, with a minimum mass of 200 g/m<sup>2</sup>, will be placed on the geomembrane,
  - o above the geotextile protective layer, a drainage and relief layer of gravel with a minimum thickness of 50 cm will be placed,



- corrugated perforated drainage pipes Ø160 mm will be laid on the gravel, at a distance of 15 m from each other, and outlets made of solid pipes with a slope of 20%, which drains the drainage water from the contours of the landfill and drains it to the eastern, western and southern sides of the landfill into the drainage water collection pipelines, which are located on the outside of the stormwater collection channel.
  - The drainage pipes will be covered with a layer of gravel of at least 50 cm thickness, which will be wrapped with a layer of geotextile according to the detail shown in Figure 3.20.
  - drainage pipes are installed in the interior of the landfill up to a maximum length of 30 m, in order to maintain their structural strength, while further in the interior of the landfill a drainage layer of stone is formed at the same distance as the drainage pipes.
- In the southern part of the Landfill for non-hazardous waste complex, a unit for washing the wheels of trucks delivering waste, as well as the machinery used within the landfill, is planned. A standard washing facility for truck wheels, featuring high-pressure water with water recirculation, will be installed. When the washing water becomes contaminated, it will be pumped into an IBC container and transported to a plant for treatment.
- It is the obligation of the Project Holder to monitor the operation of the landfill in accordance with the proper technological procedure and legal obligations (Art. 26).
  - 1) monitoring of meteorological parameters;
  - 2) surface water monitoring
  - 3) monitoring of leachate;
  - 4) groundwater monitoring;
  - 5) monitoring the amount of rainwater;
  - 6) monitoring the stability of the landfill body;
  - 7) monitoring of protective layers;
  - 8) monitoring of pedological and geological characteristics.
- It is envisaged by the project that the monitoring will be carried out by sampling and measurement in the manner given in Appendix 6. – Monitoring the operation of the landfill, which is printed with the aforementioned regulation and forms an integral part thereof.
- Sampling and measurement will be carried out:
  - 1) in a laboratory where certain tests are performed daily;
  - 2) in an accredited laboratory at certain intervals prescribed by this Regulation or more frequently, if the data in the landfill laboratory show that there has been any accident situation or deviation from the parameters defined by the permit.
- All data obtained by monitoring shall be submitted as part of the regular annual reports that the Project Holder is obliged to submit to the Environmental Protection Agency.

#### **8.4 Other measures that may affect the prevention or reduction of harmful effects on the environment:**

- In order to improve the overall performance from the point of environmental protection, it is envisaged to establish and implement an Environmental Management System (EMS). The preparation of the Plant Management and Operation Manual (Management Handbook) is in progress, which will define all activities, precise environmental protection policy, waste management quality guarantee policy, organization, work protocols, working conditions, conditions and method of treatment of residues from the thermal treatment process, reporting, EMS, work procedures in emergency situations, etc.
- The qualified person responsible for professional work in the waste management plant, appointed by the authorized person of the Project Holder, is obliged to monitor the handling of non-hazardous and hazardous waste when performing waste storage and treatment activities, in accordance with the law governing waste management and other legal regulations.



- It is the obligation of the Project Holder to provide an adequate space at the site in which the documentation on the location, plant and records kept on the types and quantities of non-hazardous and hazardous waste in question are stored.
- The management of all technological processes will be carried out through the DCS system through which all process parameters (energy consumption, water consumption, waste quantities...) will be monitored; BMS system is envisaged as well, through which video surveillance, operation of ventilation systems (air conditioning) will be monitored.
- At the entrance to the non-hazardous and hazardous waste management plant at the location in Prahovo, a board should be placed with clearly visible information on the name and type of the waste management plant, types of non-hazardous and hazardous waste whose storage is carried out, working hours of the plant, as well as contacts of the owner or persons in charge of managing the plant.
- It is the obligation of the Project Holder to label non-hazardous and hazardous waste during storage in a way that ensures safety for human health and the environment and in accordance with the applicable regulations of the Republic of Serbia.
- Municipal waste generated during the regular operation of the facility shall be sorted, separating recyclable from non-recyclable types of waste. Provide containers for separate collection of waste and delivery of recyclables (pet packaging, paper, cardboard, metal, etc.) to authorized operators for further disposal. The collected non-recyclable substances should be treated in the boiler plant in question if they meet the prescribed conditions, otherwise they should be handed over to the authorized operator for further disposal.
- Separated secondary raw materials during pretreatment of waste and treatment of slag from the boiler plant should be temporarily stored on the concrete plateau until they are handed over to authorized operators for further disposal (recycling).
- Waste stretch film, metal frames/grids removed from IBC containers/drums/jumbo bags before treatment, and damaged wooden pallets, which are considered non-hazardous waste (secondary raw materials), shall be temporarily stored in designated containers (metal containers etc.) on a concrete platform until they are handed over to authorized operators for recycling.
- The temporary storage of non-hazardous waste (separated secondary raw materials) provided in the open air is provided with a waterproof substrate from which all atmospheric water is collected and taken to the grease and oil separator.
- Packaging made of chemicals to be used at the plant in question should be used as returnable packaging or, if this is not possible, it should be referred for thermal treatment at the plant in question.
- All dust that is separated in the filtration process in the bag filter of the Waste Pretreatment Filter System and the Solidification filter system, should be collected in the associated bunkers and the screw conveyor, which is placed along the entire length of the bottom of the bunker, should be taken to the sector dispenser, which further inserts the material into the container provided for this purpose. The contents of the container should be emptied into one of the receiving waste bunkers and further referred for thermal treatment.
- After replacement, waste damaged filter bags should be treated in the boiler plant in question.
- Commercial waste generated due to daily activities in the office (paper, cardboard, staples, staples, wood in the form of disused chairs, tables, shelves, electrical and electronic equipment (telephones, computers, fax, printers ...) and other office supplies) should be sorted at the place of origin on paper and cardboard, PET, metal, wood that can be used as secondary raw materials and as such handed over to authorized operators for further treatment, and special waste streams should be disposed of in accordance with legal regulations.
- Within the complex in question, perform only temporary storage of waste generated during operation (overhauls, cleaning of process equipment, oil replacement, etc.) until its permanent disposal, which will be performed either within the boiler plant in question or by third parties, i.e. companies that have permits issued by the competent authority and that are registered to perform waste collection, transport, storage and/or treatment activities.



- Waste management generated during the regular operation of the plant should be carried out in accordance with the Waste Management Plan, which is periodically updated in accordance with the Law on Waste Management.
- Waste manipulation can only be performed by persons of the appropriate profession, trained and authorized for this type of work, dressed and equipped with proper equipment;
- The ammonia water transfer site (W-C13) is provided with a grate that will be connected to the collection pit in which any leaked contents will be collected during transfer. In this way, the possibility of possible leakage of the leaked fluid into the atmospheric sewage and the surrounding soil is avoided. The collected contents should be pumped into an IBC container and taken to a temporary storage of liquid waste materials from where, together with other liquid waste, they will be sent for thermal treatment.
- In addition to the area for transferring ammonia water, it is also planned to install a shower for the purpose of rinsing hands and eyes in case of pouring on the operator when discharging liquid waste (in case of an accident). The water from the shower flows into the aforementioned manhole.
- Below the HCl scrubber, a plastic bundwall basin is planned, and below the SO<sub>2</sub> scrubber, a concrete containment basin for capturing any potential leaks during normal operation of the scrubber system or during maintenance of system components (e.g., pumps). A drain is provided in the bundwall and the water gravitationally flows into the general technological sewer, which is connected to the wastewater basin U-C06.
- Develop appropriate technical instructions and procedures for work in the facility;
- Establish grass and other green areas in a way that does not require the use of hazardous and harmful herbicides and pesticides, or requires their minimal and always controlled application.
- It is the obligation of the Project Holder to keep the waste management plant fenced and under constant supervision, in order to prevent access to unauthorized persons. The project envisages video surveillance of the entire plant.
- The ammonia water storage tank must be cooled in the summer months by spraying the process water. The water from the cooling of the tank should be collected in the associated bundwall, then taken to the collection basin located in the immediate vicinity of the tank, and then reused for cooling purposes, thus achieving water recirculation. If there is a possible contamination of the cooling water with ammonia water, it should be pumped into an IBC container /tank and sent first to the liquid waste storage, and then treated in the boiler plant together with other liquid waste.
- Considering that the leachate is treated as part of the wastewater treatment plant at the waste-to-energy plant, any change in the quality of groundwater determined after the analysis of samples taken from the piezometers in Zone A, B or C, will be considered as an incident scenario requiring corrective action including:
  - o Physical introduction of a hydraulic barrier that changes the elevation of the groundwater, changing the flow with the aim of preventing the flow towards the Danube River as close as possible to the landfill site.
  - o Weekly verification of groundwater quality downstream during the period of existence of the hydraulic barrier.
  - o Extraction of contaminated groundwater and directing it to the wastewater treatment plant of the complex during the period of active hydraulic barrier measures.
  - o Conducting an analysis of the causes of underground water with the aim of determining the nature of the phenomenon, i.e. continued observation or notification of a one-time event and/or determination of the type of contamination with the appropriate mechanism of contaminant migration.
  - o Implementation of an expert program of mitigation measures after the analysis of the cause of groundwater (physical, mechanical or construction problem requires maintenance work, induction of an inert layer at certain locations of the landfill, introduction of layers of material with metal sorption characteristics, etc.).
  - o Re-establishing the groundwater connection with the Danube River or inducing a





- permanent mechanical barrier for water flow in accordance with the expert mitigation plan.
- If there is a leak of fuel or polluting substances and soil pollution at the location in question, and if the concentrations of polluting, dangerous and harmful substances in the soil exceed the prescribed remediation values, it is the responsibility of the Project Owner to:
    - o Notify the competent Ministry of Environmental Protection as soon as possible.
    - o Carry out soil testing and create a land remediation and recultivation project and obtain the consent of the competent authority.
    - o Carry out land remediation and recultivation by engaging specialized companies/operators (using, for example, physical remediation methods, chemical remediation methods, biological remediation, phytoremediation, etc.).
    - o • Submit to the competent ministry for environmental protection the Report on the performed remediation and land recultivation no later than within 30 days from the date of completion of the project. The report contains in particular:
      - 1) data on the condition of the soil before remediation or recultivation;
      - 2) list of methods and standards that were used during the implementation of remediation or recultivation;
      - 3) list of materials that were used in order to achieve remediation or recultivation;
      - 4) data on the condition of the soil after remediation or recultivation;
      - 5) assessment of the success of the measures taken;
      - 6) proposal of measures to maintain the achieved soil condition;
      - 7) data on the registration and competence of the rehabilitation and remediation contractor and the author of the report.

### 8.4.1 Landfill closure method and procedure

- The surface of the landfill or one part thereof shall be closed when the conditions specified in the permit and the project for closing the entire landfill or one part thereof are met. When the designed elevations are reached, the closure reduces the effect of the open landfill immediately after reaching the final elevations and reduces leachate and air pollution.
- As the landfill progresses in height, carry out the reclamation of the external slope by first placing a waterproof layer with a minimum thickness of 50 cm, followed by a 20 cm drainage layer of gravel, on top of which a 50 cm thick layer of humus must be applied. A geotextile with a minimum weight of 150 g/m<sup>2</sup> should be placed between the gravel and the humus layer. This will help prevent potential air pollution and slow down surface runoff, which can be significant in the case of greater landfill heights.
- After the completion of the exploitation period, it is the obligation of the Project Holder to close the landfill for further disposal by forming an upper covering layer that meets the following technical and technological requirements:

Measures applied in terms of the formation of the upper overlay	Landfill class
	For non-hazardous waste
Landfill gas drainage layer $\geq 0.3$ m	not required *
Artificial waterproof lining - foil	not required
Impermeable mineral layer $\geq 0.5$ m	required
Reclamation layer $\geq 0.5$ m	required

\*At the subject landfill for the disposal of non-hazardous waste / solid, non-reactive hazardous waste (solidified) whose leachate is equivalent to that for non-hazardous waste and which meets the limit values of the parameters for the disposal of hazardous waste at landfills of non-hazardous, there will be no emissions of landfill gas. All chemical reactions in which hydrogen may be emitted, etc., will take place during the stabilization and solidification process, which takes place under strictly controlled



conditions in the stabilization and solidification facility within the plant, and before the process of disposing of the solidificates at the landfill in question.

- For the reclamation layer, use compost or waste obtained through other biological treatment technologies, provided that it meets the concentration limits for waste disposal parameters.
- The landfill or part of the landfill shall be closed in accordance with the permit, when the conditions for closing the landfill are met or due to unforeseen circumstances that endanger the environment, in accordance with special regulations.
- After the closure of the landfill and until its final closure, the landfill operator (Project Holder) must take measures related to:
  - (1) maintenance, supervision, control and monitoring of the landfill area, in accordance with the Regulation on the disposal of waste at landfills and the Law on Waste Management;
  - (2) compiling a report on the state of the landfill for each calendar year and submitting it to the competent authority no later than 31<sup>st</sup> March for the previous calendar year;
  - (3) reporting of irregularities determined by control and monitoring, which may adversely affect the environment, which shall be submitted to the competent institutions, within seven days from the date of determination.
- Measures to prevent or reduce environmental pollution shall be implemented by the Project Holder at its own expense and within the given deadline, in accordance with the Law on Waste Management.
- The landfill or a portion of it is considered finally closed for further disposal when all requirements of Article 24, Paragraph 2 of the Regulation on Waste Landfill Disposal are met, in accordance with the permit from the relevant authority regarding the cessation of landfill operations.